

constant support

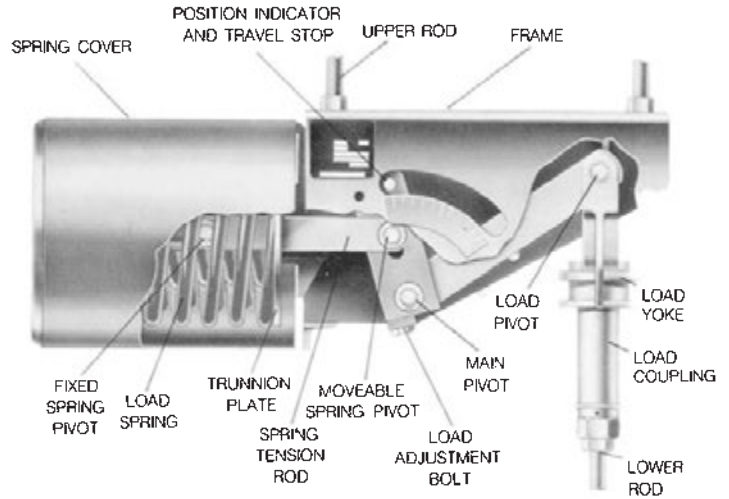
mathematically perfect pipe support

The exclusive geometric design of Unison Model Constant Support hanger assures perfectly constant support through the entire deflection of the pipe load.

This counter-balancing of the load and spring moments about the main pivot is obtained by the use of carefully designed compression type load springs, lever and spring tension rods.

As the lever moves from the high to the low position, the load spring is compressed and the resulting increasing force acting on the decreasing spring moment arm creates a turning moment about the main pivot which is exactly equal and opposite to the turning moment of the load and load moment arm.

As the lever moves from the low to the high position, the load spring is increasing in length and the resulting decreasing force acting on the increasing spring moment arm creates a turning moment about the main pivot which is exactly equal and opposite to the turning moment of the load and load moment arm.

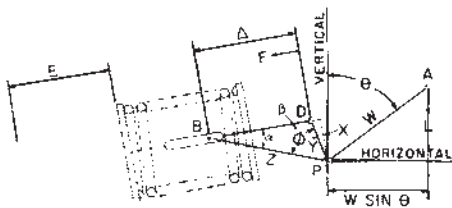


$$(5) \text{ Spring moment} = F \left( \frac{YZ \sin \phi}{\Delta} \right), \text{ where } \frac{YZ \sin \phi}{\Delta}$$

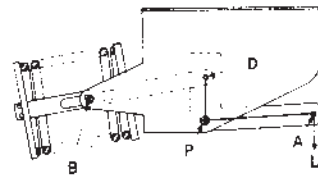
is the spring moment arm.

The spring force "F" is equal to the spring constant "K" times the spring deflection "E"; thus:

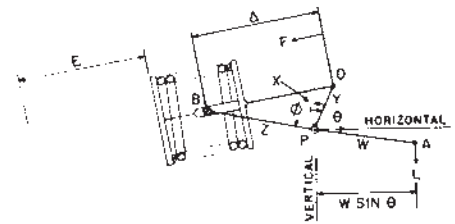
(6) F=KE; therefore equation #5 may be written:



high position



mid position



low position

$$(1) \frac{\sin \alpha}{Y} = \frac{\sin \phi}{\Delta}, \quad \frac{\sin \alpha}{Y} = \frac{\sin \beta}{Z}, \quad \sin \alpha = \frac{YZ \sin \beta}{Z}$$

$$\text{and } Y \sin \beta = X, \quad \sin \alpha = \frac{X}{Z}$$

Substituting in (1):

$$(2) \frac{X}{YZ} = \frac{\sin \phi}{\Delta} \quad (3) X = \frac{YZ \sin \phi}{\Delta}$$

The load "L" is suspended from the lever at point "A" and at any point within the load travel range the moment of the load about the main lever-pivot "P" is equal to the load times its moment arm; thus:

(4) Load moment=L(W sin theta), where W sin theta is the load moment arm.

The spring is attached at one of its ends to the fixed pivot "B". The spring's free end is attached by means of a rod to the lever-pivot "D". This spring arrangement provides a spring moment about the main lever-pivot "P" which opposes the load moment and is equal to the spring force "F" times its moment arm; thus:

$$(7) \text{ Spring moment} = KE \left( \frac{YZ \sin \phi}{\Delta} \right)$$

To obtain perfect constant support the load moment must always equal the spring moment.

$$(8) LW \sin \theta = \frac{KEYZ \sin \phi}{\Delta}$$

By proper design "phi" and "theta" are made equal. Therefore, equation #8 may be written.

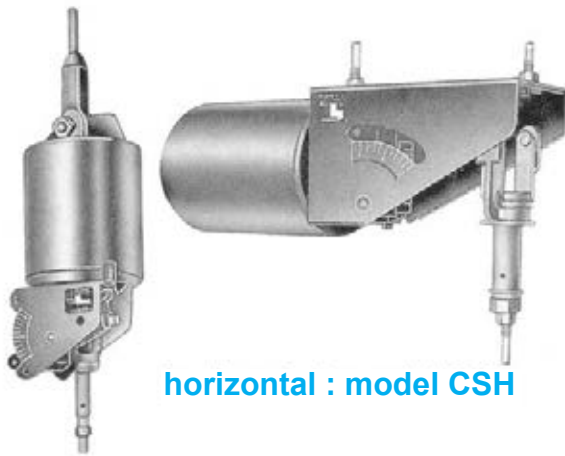
$$(9) LW = \frac{KEYZ}{\Delta}$$

The spring and the rod are so arranged that the spring deflection "E" always equals the distance "Delta" between pivots "B" and "D". Therefore, equation #9 may be written.

$$(10) LW=KEYZ \text{ or } (11) L = \frac{KEYZ}{W}$$

Since equation #11 holds true for all positions of the load within its travel range and "K", "Y", "Z" and "W" remain constant it is therefore true that perfect constant support is obtained.

## constant support



horizontal : model CSH

## vertical : model CSV

**RECOMMENDED SERVICE :** When piping stress is critical and pipe is subject to vertical movement in excess of 13mm due to thermal expansion, and also at locations where it is necessary to avoid any transfer of stress from support to support or onto critical terminals or connecting equipment.

**FEATURES :**

- Because of exclusive geometric design, mathematically perfect constancy of support is maintained throughout the full range of load adjustment.
- Compactness—new design provides smaller and more versatile units.
- Increased load and travel capacity.
- Each hanger is individually calibrated before shipment to support the exact load specified.
- All models of Constant Supports have a wide range of load adjustability. No less than 10% of this adjustability is provided either side of the calibrated load for plus or minus field load adjustment.
- Blue button marked "C" denotes cold setting of hanger; red button marked "H" denotes hot or operating setting.
- Field load adjustment is made by turning the single load adjustment bolt.
- Covered spring provides protection and good appearance.
- J-rod swings at least 4° from vertical.
- Non-resonant to all vertical vibrations.

**SIZE RANGE :** Unison Constant Support Hangers are made in two basic designs—the CSV (vertical design) and the CSH (horizontal design). Combined, the CSV and CSH Constant Supports are made in nine different frame sizes and one hundred and ten spring sizes to accommodate travels from 40mm to 510mm and loads from 12kg to 40,325kg.

**SINGLE ROD SUSPENSION :** Available in types A, B and C of model CSV and model CSH.

**HOW TO SELECT HANGER SIZE :** Determine the total load to be supported by the hanger as well as the actual travel—that is, the actual vertical movement of the pipe at the point of hanger location. Refer to the Load-Travel table for Constant Support hangers (page 42 to 45) and select a size hanger which will accommodate the known load and actual travel. It must be noted that the travel shown in the table is a total travel—that is, the maximum vertical movement which the hanger will accommodate. The total travel of the hanger should always be greater than the calculated travel of the pipe line to allow for some discrepancy between calculated travel and actual travel. It is suggested that the total travel for Constant Supports should be equal to "actual travel" plus 20% and in no case less than 25mm.

**HOW TO DETERMINE DESIGN :** After the size of the Constant support is determined, consideration of available room for suspending the pipe and hanger will indicate whether a vertical CSV series or horizontal CSH series hanger is desirable.

**HOW TO DETERMINE TYPE :** After the hanger size and design are determined, the type of constant support to be used depends upon the physical installation required by the suspension problem, i.e., whether the hanger is to be installed above, between or below steel members (see line cuts referring to Types A, B, C etc.). It will be noted that the Types F and G are made in the vertical design only. Special Constant Support Hangers can be fabricated for unusual conditions.

**J-ROD AND K-HOLE DIAMETER :** Tapping or drilling for standard rod size will be furnished as shown in the J-rod and K-hole selection charts unless otherwise specified. Upper attachments, turnbuckles and clamps should be tapped to agree with the rod as shown in the selection chart. Standard rod diameters are based on the load to be carried by the upper rod which includes the weight of the hanger assembly as well as the pipe line.

**ORDERING :** Specify hanger size number, model name, loads to be supported (kg), total travel (mm), actual travel (mm) also direction "cold" to "hot", customer's hanger mark. When ordering Type G, specify C-C rod dimension as well as load per spring and total load. For Types A, B, C, model CSH when required, specify "for single rod suspension." Constant Support Hangers are also available corrosion-resistant as model C-CSV and C-CSH."

## constant support

### INSTALLATION

- (1) Securely attach the hanger to the building structure at a point where the load coupling is directly over the desired point of attachment to the pipe in the operating position.
- (2) Make certain that the moving parts of the hanger will be unobstructed.
- (3) Attach the lower J-rod between the pipe attachment and the load coupling. Make certain that the lower J-rod has enough thread engagement before taking up the load. A sight hole is provided for this.

- (4) Turn the load coupling, as you would a turn-buckle, until the travel indicator rotates to the desired cold setting (blue sticker) marked "C" indicated on the position scale. If the Constant Support incorporates a travel stop see below.
- (5) After the line is in operation, check hanger for indicated hot setting. If necessary, make adjustment by turning the load coupling to bring the indicator to the hot position (red sticker) marked "H". No other adjustment is normally required since the load as calibrated at the factory is equal to the load specified to be supported.

**ADJUSTMENT:** When the hanger is installed, its supporting force should be in balance with the portion of the piping weight assigned to it. Each hanger is individually calibrated before shipment to support the exact load specified. All models of Constant Supports have a wide range of load adjustability. Special instructions for this field recalibration of individual hangers may be obtained from Unison. No less than 10% of this adjustability is provided either side of the calibrated load for plus or minus field load adjustment.

The percentage increase or decrease from the factory calibrated load should be carefully calculated. The calibrated load setting of each hanger is indicated by an arrow, die-stamped on the load adjustment scale. Load adjustments should be made from this reference point, with each division on the patented scale equal to 2% except sizes 84 - 110 where each division is valued at 1%. The load adjustment is made by turn-



Load adjustment scale shown applies to size 1 through 83 only. For information relative to load adjustment scale for sizes 84 through 110, contact with Unison.

ing the single load adjustment bolt. For example, calibrated load - 1,361kg; revised load - 1,252kg. Load is decreased 109kg or 109/1,361 equals 8%.

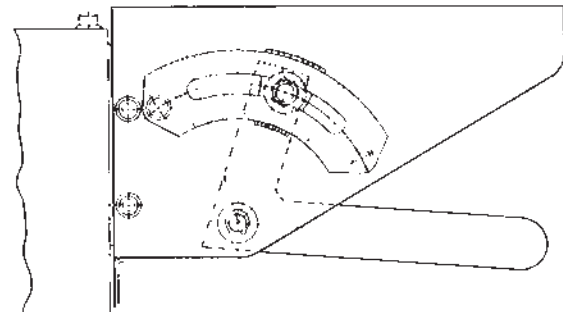
Turn load adjustment bolt until arrow moves in the "decrease" direction four divisions.

**TRAVEL STOP:** The functional design of the Constant Support Hanger permits the incorporation of a travel stop that will lock the hanger against upward or downward movement for temporary conditions of underload or overload, such as may exist during erection, hydrostatic test or chemical clean-out.

The travel stop consists of two plates, with matched serrations, attached to the hanger frame with two or more cap screws and with a socketed piece which engages the position indicator.

It is installed at the factory to hold the hanger in the "cold" position. A series of serrations can be engaged to lock the hanger at any position along the total travel range.

The travel stop, which is furnished only when specified, is painted red. The stop must be removed before the piping system is put into operation, but not before the hanger is installed



and fully loaded. The travel stop is released by removing the cap screws.

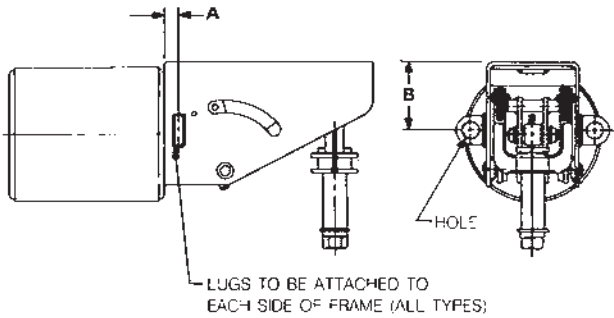
A red tag marked "Caution" and containing instructions for removal of the travel stop is attached to the hanger.

constant support

lifting lugs :

To help alleviate the problem of lifting large size Constant Supports into position for installation, this product is available with lifting lugs (if requested) on sizes ten and larger.

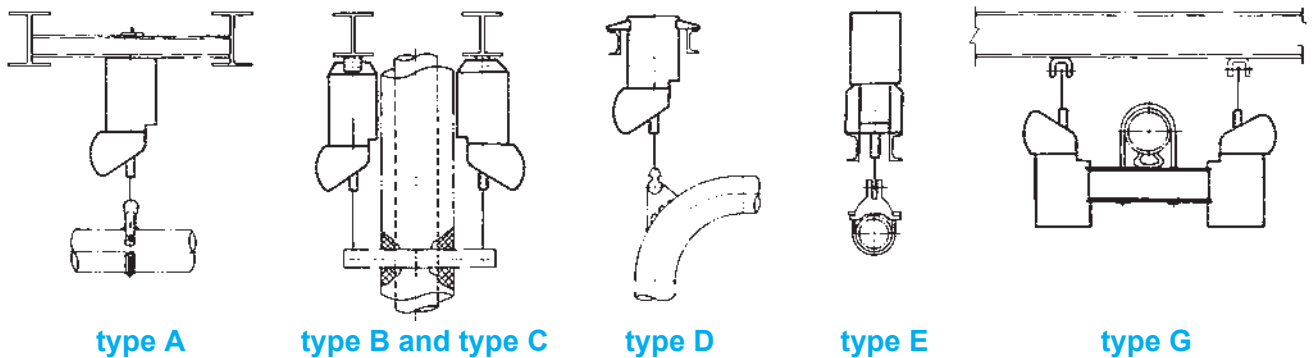
model : CSH



sizes	A	B	hole size
10- 18	30	125	22
19- 34	40	180	
35- 49	50	190	
50- 63	50	240	
64- 74	50	355	
75- 83	75	430	33
84-110	75	485	

typical applications

model : CSV(vertical)



type A

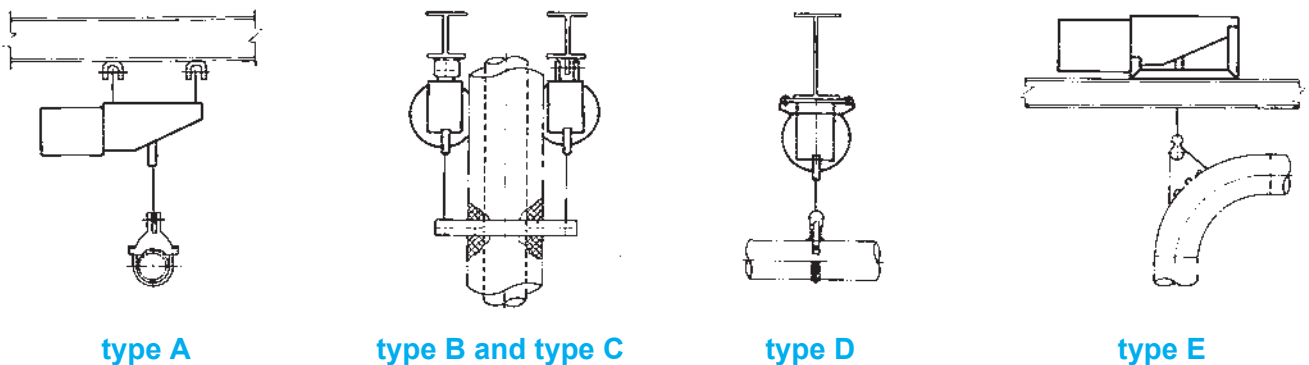
type B and type C

type D

type E

type G

model : CSH(horizontal)



type A

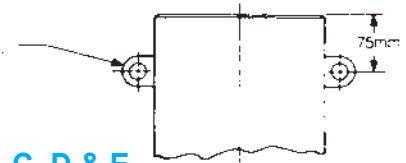
type B and type C

type D

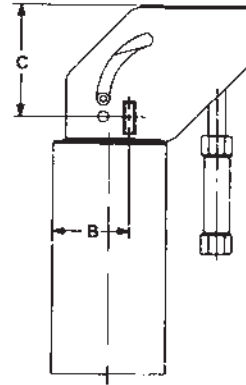
type E

model : CSV

LUGS TO BE 90° FROM CHANNEL ON TYPE D



CSV types A, B, C, D & E sizes 10 thru 63



sizes 84 through 110.

Lugs to be attached to each side of frame and will need stabilizing rigging when being lifted.

sizes 64 thru 83

sizes	A	B	C
64- 74	200	255	-
75- 83	200	280	
84-110	-	405	610



constant support model CSV and CSH

load travel table(load in kgs for total travel in mm)

hanger size no.	total travel in mm														
	40	50	65	75	90	100	115	125	140	150	165	180	190	205	215
1	62	50	38	33	28	25	22	20	18	17	15	14	13	12	
	75	60	46	40	33	30	26	24	21	20	18	17	16	15	
2	88	70	54	47	39	35	31	28	25	23	21	20	19	17	
3	101	81	62	54	45	40	35	32	29	27	24	22	21	20	
4	121	97	74	65	54	48	42	39	35	32	29	27	25	24	
5	141	113	87	75	63	56	49	45	40	38	34	31	30	28	
6	161	129	99	86	72	64	56	52	46	43	39	36	34	31	
7	195	156	120	104	87	78	68	62	56	52	47	43	41	38	
8	228	182	140	122	101	91	79	73	65	61	55	51	48	44	
9	259	207	159	138	115	104	90	83	74	69	63	58	55	51	
10	314	251	193	167	140	126	109	100	90	84	76	70	66	61	
11	368	294	226	196	164	147	128	118	105	98	89	82	77	72	
12	422	338	260	225	188	169	147	135	121	113	102	94	89	82	
13	509	407	313	271	226	204	177	163	145	136	123	113	107	99	
14	593	474	365	316	264	237	206	190	169	158	144	132	125	116	
15	680	544	418	363	302	272	237	218	194	181	165	151	143	133	
16	818	654	503	436	364	327	285	262	234	218	198	182	172	160	
17	958	766	590	511	426	383	333	307	274	255	232	213	202	187	
18	1097	878	675	585	488	439	382	351	313	293	266	244	231	214	
19															204
		933	718	622	518	467	406	373	333	311	283	259	246	228	217
20		989	761	659	549	495	430	396	353	330	300	275	260	241	230
21		1076	828	717	598	538	468	430	384	359	326	299	283	262	250
22		1164	895	776	647	582	506	466	416	388	353	323	306	284	271
23		1249	961	833	694	625	543	500	446	416	378	347	329	305	290
24		1341	1032	894	745	671	583	536	479	447	406	373	353	327	312
25		1433	1102	955	796	717	623	573	512	478	434	398	377	350	333
26		1525	1173	1017	847	763	663	610	545	508	462	424	401	372	355
27		1673	1287	1115	929	837	727	669	598	558	507	465	440	408	389
28		1820	1400	1213	1011	910	791	728	650	607	552	506	479	444	423
29		1968	1514	1312	1093	984	856	787	703	656	596	547	518	480	458
30		2090	1608	1393	1161	1045	909	836	746	697	633	581	550	510	486
31		2210	1700	1473	1228	1105	961	884	789	737	670	614	582	539	514
32		2332	1794	1555	1296	1166	1014	933	833	777	707	648	614	569	542
33		2440	1877	1627	1356	1220	1061	976	871	813	739	678	642	595	567
34		2546	1958	1697	1414	1273	1107	1018	909	849	772	707	670	621	592
35			2081	1804	1503	1353	1176	1082	966	902	820	751	712	660	629
36			2201	1908	1590	1431	1244	1145	1022	954	867	795	753	698	665
37			2322	2012	1677	1509	1312	1207	1078	1006	915	839	794	736	702
38			2489	2157	1798	1618	1407	1294	1156	1079	981	899	852	789	752
39			2653	2299	1916	1724	1500	1380	1232	1150	1045	958	908	841	802
40			2818	2442	2035	1832	1593	1465	1308	1221	1110	1018	964	894	852
41			3091	2679	2232	2009	1747	1607	1435	1339	1218	1116	1057	980	934
42			3362	2914	2428	2185	1900	1748	1561	1457	1324	1214	1150	1066	1016
43			3634	3149	2625	2362	2054	1890	1687	1575	1432	1312	1243	1152	1099
44			3866	3351	2792	2513	2185	2010	1795	1675	1523	1396	1323	1226	1169
45			4114	3565	2971	2674	2325	2139	1910	1783	1621	1486	1407	1304	1244
46			4325	3748	3124	2811	2445	2249	2008	1874	1704	1562	1480	1371	1308
47			4598	3985	3321	2989	2599	2391	2135	1992	1811	1660	1573	1458	1390
48			4869	4220	3517	3165	2752	2532	2261	2110	1918	1758	1666	1544	1472
49			5140	4455	3712	3341	2905	2673	2386	2227	2025	1856	1758	1630	1554
50				4778	3982	3584	3116	2867	2560	2389	2172	1991	1886	1748	1667
51				5100	4250	3825	3326	3060	2732	2550	2318	2125	2013	1866	1779
52				5460	4550	4095	3561	3276	2925	2730	2482	2275	2155	1998	1905
53				5817	4848	4363	3794	3490	3116	2909	2644	2424	2296	2128	2029
54				6175	5146	4631	4027	3705	3308	3088	2807	2573	2438	2259	2154
55				6781	5651	5086	4422	4069	3633	3391	3082	2825	2677	2481	2365
56				7384	6153	5538	4816	4430	3956	3692	3356	3077	2915	2701	2576
57				7988	6657	5991	5210	4793	4279	3994	3631	3328	3153	2922	2787
58				8490	7075	6368	5537	5094	4548	4245	3859	3538	3351	3106	2962
59				8991	7493	6743	5864	5395	4817	4496	4087	3746	3549	3289	3136
60				9494	7912	7121	6192	5696	5086	4747	4315	3956	3748	3473	3312
61				10088	8407	7566	6579	6053	5404	5044	4585	4203	3982	3691	3519
62				10681	8901	8011	6966	6409	5722	5341	4855	4450	4216	3908	3726
63				11274	9395	8456	7353	6764	6040	5637	5125	4698	4450	4125	3933
<b>'B' average mm</b>	<b>37</b>	<b>46</b>	<b>60</b>	<b>69</b>	<b>83</b>	<b>92</b>	<b>106</b>	<b>115</b>	<b>129</b>	<b>138</b>	<b>152</b>	<b>166</b>	<b>175</b>	<b>189</b>	<b>198</b>

constant support model CSV and CSH

load travel table(load in kgs for total travel in mm)

hanger size no.	total travel in mm														
	230	240	255	265	280	290	305	320	330	345	355	370	380	395	405
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19	191	183	172												
20	203	194	183												
21	215	206	194												
22	234	224	211												
23	253	243	228												
24	272	260	245												
25	292	279	263												
26	312	299	281												
27	332	318	299												
28	364	349	328												
29	396	379	357												
30	428	410	386												
31	454	435	410												
32	480	460	433												
33	507	486	457												
34	530	508	478												
35	553	530	499												
36				480	455	439	417	398	386	369	359				
37	588	564	530	510	483	466	443	423	410	392	381				
38	622	596	561	540	511	493	469	447	434	415	403				
39	656	629	592	570	539	520	495	472	457	437	425				
40	703	674	634	611	578	558	530	506	490	469	456				
41	750	719	676	651	616	595	565	539	523	500	486				
42	796	763	718	691	654	632	601	572	555	531	516				
43	874	837	788	758	718	693	659	628	609	582	566				
44	950	911	857	825	780	754	716	683	662	633	616				
45	1027	984	926	891	844	815	774	738	716	685	665				
46	1093	1047	985	948	897	867	824	785	761	728	708				
47	1163	1114	1049	1009	955	922	877	836	810	775	753				
48	1222	1171	1102	1061	1004	969	922	879	852	815	792				
49	1299	1245	1172	1128	1067	1031	980	934	906	866	842				
50	1376	1319	1241	1194	1130	1091	1038	989	959	917	892				
51	1453	1392	1310	1261	1193	1152	1095	1044	1012	968	941				
52												903	879	846	825
53	1558	1493	1405	1352	1280	1236	1175	1120	1086	1039	1009	969	943	907	885
54	1663	1594	1500	1443	1366	1319	1254	1195	1159	1109	1077	1034	1007	968	944
55	1780	1706	1606	1545	1463	1412	1343	1280	1241	1187	1154	1107	1078	1037	1011
56	1897	1818	1711	1646	1558	1504	1430	1363	1322	1265	1229	1179	1148	1104	1077
57	2014	1930	1816	1748	1654	1597	1518	1447	1403	1342	1305	1252	1219	1172	1144
58	2211	2119	1994	1919	1816	1754	1667	1599	1541	1474	1433	1375	1338	1288	1256
59	2408	2308	2172	2090	1978	1910	1816	1731	1678	1605	1560	1497	1457	1402	1367
60	2605	2496	2349	2261	2140	2066	1964	1872	1815	1737	1688	1619	1577	1517	1479
61	2768	2653	2497	2403	2274	2196	2088	1990	1930	1846	1794	1721	1676	1612	1572
62	2932	2810	2644	2545	2408	2325	2211	2107	2043	1955	1900	1823	1775	1707	1665
63	3096	2967	2792	2687	2543	2455	2335	2225	2158	2064	2006	1924	1874	1803	1758
64	3290	3153	2967	2855	2702	2609	2481	2364	2293	2193	2131	2045	1991	1915	1868
65	3483	3338	3141	3023	2861	2762	2626	2503	2428	2322	2257	2165	2108	2028	1978
66	3676	3523	3316	3191	3020	2916	2772	2642	2562	2451	2382	2285	2225	2141	2088
<b>B' average mm</b>	212	221	235	244	258	267	281	290	304	317	327	341	350	364	373

constant support model CSV and CSH

load travel table(load in kgs total travel in mm)

hanger size no.	total travel in mm																
	100	115	125	140	150	165	180	190	205	215	230	240	255	265	280	290	305
64	8860	7704	7088	6329	5907	5370	4922	4663	4322	4121	3852	3692	3475	3343	3164	3055	2905
65	9263	8055	7410	6616	6175	5614	5146	4875	4519	4308	4027	3860	3633	3495	3308	3194	3037
66	10170	8843	8136	7264	6780	6164	5650	5353	4961	4730	4422	4238	3988	3838	3632	3507	3334
67	11076	9631	8861	7911	7384	6713	6153	5829	5403	5152	4816	4615	4344	4180	3956	3819	3631
68	11982	10419	9586	8559	7988	7262	6657	6306	5845	5573	5210	4993	4699	4522	4279	4132	3929
69	12736	11075	10189	9097	8491	7719	7076	6703	6213	5924	5537	5307	4995	4806	4549	4392	4176
70	13488	11729	10790	9634	8992	8175	7493	7099	6580	6273	5864	5620	5289	5090	4817	4651	4422
71	14240	12383	11392	10171	9493	8630	7911	7495	6946	6623	6191	5933	5584	5374	5086	4910	4669
72	15132	13158	12106	10809	10088	9171	8407	7964	7381	7038	6579	6305	5934	5710	5404	5218	4961
73	16023	13933	12818	11445	10682	9711	8902	8433	7816	7453	6967	6676	6284	6046	5723	5525	5253
74	16913	14707	13530	12081	11275	10250	9396	8902	8250	7867	7353	7047	6633	6382	6040	5832	5545
75	17881	15549	14305	12772	11921	10837	9934	9411	8722	8317	7774	7450	7012	6748	6386	6166	5863
76	18849	16390	15079	13464	12566	11424	10472	9921	9195	8767	8195	7854	7392	7113	6732	6500	6180
77	19817	17232	15854	14155	13211	12010	11009	10430	9667	9217	8616	8257	7771	7478	7078	6833	6497
78	20893	18168	16714	14924	13929	12662	11607	10996	10192	9718	9084	8705	8193	7884	7462	7204	6850
79	21968	19103	17574	15691	14645	13314	12204	11562	10716	10218	9551	9153	8615	8290	7846	7575	7203
80	23043	20037	18434	16459	15362	13965	12802	12128	11240	10718	10019	9601	9036	8695	8230	7946	7555
81	24195	21039	19356	17282	16130	14664	13442	12734	11802	11253	10520	10081	9488	9130	8641	8343	7933
82	25347	22041	20278	18105	16898	15362	14082	13341	12364	11789	11020	10561	9940	9565	9053	8740	8310
83	26499	23043	21199	18928	17666	16060	14722	13947	12926	12325	11521	11041	10392	10000	9464	9138	8688
84			22674	20245	18895	17177	15746	14917	13826	13183	12323	11809	11115	10695	10122	9773	9293
85			24149	21562	20124	18295	16770	15888	14725	14040	13124	12578	11838	11391	10781	10409	9897
86			25532	22796	21277	19342	17731	16797	15568	14844	13876	13298	12516	12043	11398	11005	10464
87			26914	24030	22428	20389	18690	17707	16411	15648	14627	14018	13193	12695	12015	11601	11030
88			28297	25265	23581	21437	19651	18616	17254	16452	15379	14738	13871	13348	12633	12197	11597
89			30417	27158	25348	23043	21123	20011	18547	17684	16531	15842	14910	14348	13579	13111	12466
90					28265	25695	23554	22314	20682	19720	18434	17666	16626	15999	15142	14620	13901
91					30953	28139	25794	24437	22649	21595	20187	19346	18208	17521	16582	16010	15223
92					33873	30794	28228	26742	24785	23632	22091	21171	19925	19173	18146	17521	16659
93					37251	33865	31043	29409	27257	25989	24294	23282	21912	21085	19956	19268	18320
94					40325	36659	33604	31836	29506	28134	26299	25203	23721	22825	21603	20858	19832
95							35365	33504	31052	29608	27677	26524	24964	24022	22735	21951	20871
96							36806	34869	32317	30814	28805	27605	25981	25000	23661	22845	21722
97							38246	36233	33582	32020	29932	28685	26997	25978	24587	23739	22571
98							39205	37142	34424	32823	30682	29404	27674	26630	25203	24334	23137
99								39111	36249	34563	32309	30963	29142	28042	26540	25624	24364
100								39794	36882	35167	32873	31504	29650	28532	27003	26072	24790
101									39060	37243	34814	33364	31401	30216	28598	27611	26253
102									39342	37512	35066	33605	31628	30434	28804	27811	26443
103										39856	37257	35704	33604	32336	30604	29548	28095
104											39323	37685	35468	34129	32301	31187	29653
105											39448	37804	35581	34238	32404	31286	29748
106												39905	37558	36140	34204	33025	31401
107													39534	38042	36004	34763	33053
108														39945	37805	36501	34706
109															39581	38216	36337
110															39605	38239	36359
B'dim. sizes 64-83	92	106	115	129	138	152	166	175	189	198	212	221	235	244	258	267	281
B'dim. sizes 84-110	-	-	105	117	126	138	150	159	172	180	193	201	214	222	235	243	256



constant support model CSV and CSH

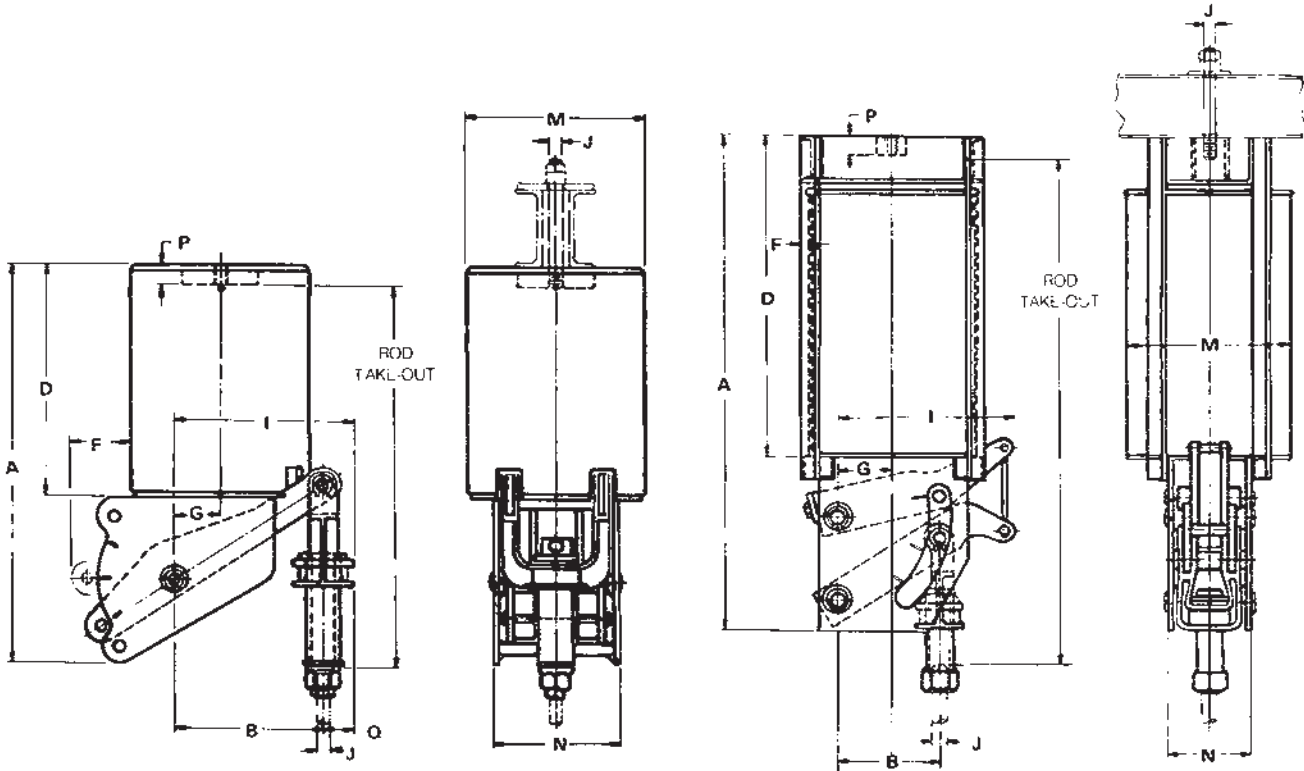
load travel table(load in kgs for total travel in mm)

hanger size no.	total travel in mm															
	320	330	345	355	370	380	395	405	420	430	445	455	470	485	495	510
64	2769	2685	2568	2496	2395	2332	2243	2188								
65	2895	2807	2685	2609	2504	2438	2345	2287								
66	3178	3082	2948	2865	2749	2676	2575	2511								
67	3461	3356	3210	3120	2994	2915	2804	2735								
68	3744	3631	3473	3375	3238	3153	3033	2959								
69	3980	3859	3692	3588	3442	3352	3224	3145								
70	4215	4087	3910	3799	3645	3549	3415	3330								
71	4450	4315	4128	4011	3849	3747	3605	3516								
72	4729	4585	4386	4263	4090	3982	3831	3736								
73	5007	4855	4644	4514	4331	4217	4056	3956								
74	5285	5125	4902	4764	4571	4451	4282	4176								
75	5588	5418	5183	5037	4833	4706	4527	4415								
76	5890	5712	5463	5310	5094	4960	4772	4654								
77	6193	6005	5744	5582	5356	5215	5017	4893								
78	6529	6331	6056	5885	5647	5498	5289	5159								
79	6865	6657	6368	6188	5937	5781	5562	5424								
80	7201	6983	6679	6491	6228	6064	5834	5690								
81	7561	7332	7013	6815	6539	6367	6125	5974								
82	7921	7681	7347	7140	6851	6670	6417	6259								
83	8281	8030	7681	7465	7162	6973	6709	6543								
84	8857	8589	8215	7984	7660	7459	7175	6998								
85	9433	9147	8750	8503	8158	7944	7642	7453								
86	9973	9671	9251	8990	8626	8399	8080	7880								
87	10513	10195	9751	9477	9093	8853	8517	8307								
88	11054	10719	10253	9964	9560	9308	8955	8734								
89	11882	11522	11021	10710	10276	10006	9626	9388								
90	13249	12848	12289	11943	11459	11157	10734	10469								
91	14509	14070	13458	13079	12549	12218	11754	11464								
92	15878	15397	14727	14313	13732	13371	12863	12546								
93	17461	16932	16196	15740	15102	14704	14146	13797								
94	18902	18330	17533	17039	16348	15918	15313	14935								
95	19893	19290	18451	17932	17025	16752	16116	15718	14402	14067	13593	13294	12870	12472	12220	11860
96	20703	20076	19203	18662	17906	17434	16772	16358	15156	14804	14305	13991	13544	13125	12860	12482
97	21513	20861	19954	19392	18606	18117	17429	16998	16391	16010	15470	15130	14647	14194	13908	13499
98	22053	21385	20455	19879	19073	18571	17866	17424	16802	16411	15858	15510	15015	14550	14256	13837
99	23222	22518	21539	20933	20084	19556	18813	18348	17693	17282	16699	16332	15811	15322	15012	14571
100	23628	22912	21916	21298	20435	19897	19141	18669	18002	17583	16991	16617	16087	15589	15274	14825
101	25023	24265	23210	22556	21641	21072	20272	19771	19065	18622	17994	17598	17037	16510	16176	15701
102	25203	24440	23377	22719	21798	21224	20418	19914	19203	18756	18124	17726	17160	16629	16293	15814
103	26778	25967	24838	24138	23160	22550	21694	21158	20402	19928	19256	18833	18232	17668	17311	16802
104	28263	27407	26215	25477	24444	23801	22897	22332	21534	21033	20324	19878	19243	18648	18271	17734
105	28353	27494	26299	25558	24522	23876	22970	22403	21602	21100	20389	19941	19304	18707	18329	17790
106	29929	29022	27760	26978	25884	25203	24246	23647	22803	22273	21522	21049	20377	19747	19348	18779
107	31504	30549	29221	28398	27246	26529	25522	24892	24003	23445	22654	22156	21449	20786	20366	19767
108	33079	32077	30682	29818	28609	27856	26799	26137	25203	24617	23787	23265	22522	21826	21385	20756
109	34633	33584	32124	31219	29953	29165	28057	27365	26387	25774	24905	24358	23580	22851	22389	21731
110	34654	33604	32143	31238	29971	29183	28074	27381	26403	25789	24920	24372	23594	22865	22403	21744
'B' dim. sizes 64-83	290	304	317	327	341	350	364	373	-	-	-	-	-	-	-	-
'B' dim. sizes 84-110	268	276	289	297	310	318	331	339	351	360	373	381	394	406	418	427



constant support vertical type - A

model : CSV - A



sizes 10-63

sizes 64-83

NOTES : See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

dimensions(mm)

hanger size	A	D	F	G	I	diam M	N	P	Q	total travel	factor <sup>■</sup>	J-rod		
												min thread length	min rod diam	max. rod diam
1- 9	available in model CSH only.													
10- 18	418	225	50	38	●	216	160	22	90	90 or less 100 or more	430 490	45*TT	M12	M20
19- 34	667	405	55	67	●	319	213	30	102	125 or less 140 or more	710 765	60*TT	M12	M30
35- 49	795	465	120	95	●	356	252	38	140	150 or less 165 or more	822 940	85*TT	M12	M42
50- 63	1190	715	210	150	●	457	285	50	165	280 or less 290 or more	1180 1315	110*TT	M20	M56
64- 74	1715	1125	30	190	●	645	565	65	-	265 or less 280 or more	1972 1975	145*TT	M30	M72
75- 83	1765	1175	38	190	●	645	690	75	-	265 or less 280 or more	1985 1990	145*TT	M36	M85
84-110	see page 51													

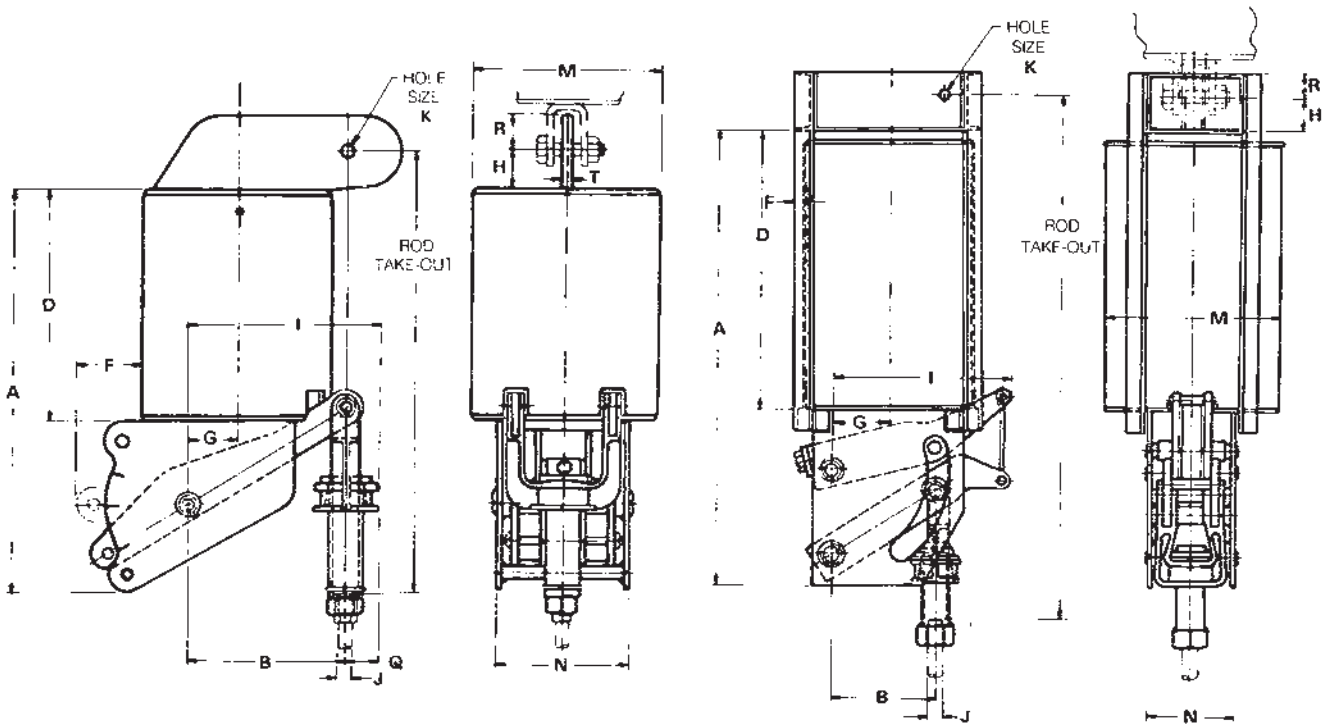
■ Rod take - out = (factor) ± (Actual Travel / 2) ● "I" dimension for sizes 10 through 63 equals "B" plus "Q"  
 (+ : Moving Up, - : Moving Down)

J-rod selection chart

load kg	0	363	681	1153	1815	2768	4264	6079	8301	11204	14062	17691	21773
	362	680	1152	1814	2767	4263	6078	8300	11203	14061	17690	21772	26308
rod diam	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85

constant support vertical type -B

model : CSV -B



! sizes 10-63

sizes 64-83

NOTES : See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

dimensions(mm)

hanger size	A	D	F	G	H	I	diam M	N	Q	R	T	total travel	factor <sup>■</sup>	J-rod		
														min thread length	min rod diam	max rod diam
1- 9	available in model CSH only.															
10- 18	418	225	50	38	38	●	216	160	90	38	9	90 or less 100 or more	490 550	45+TT	M12	M20
19- 34	667	405	55	67	50	●	319	213	102	38	16	125 or less 140 or more	790 843	60+TT	M12	M30
35- 49	795	465	120	95	75	●	356	252	140	33K-hole and smaller 38 33K-hole and larger 50	19	150 or less 165 or more	937 1055	85+TT	M12	M42
50- 63	1190	715	210	150	100	●	457	285	165	33K-hole 38, 33K-hole 50 48K-hole and larger 76	24	280 or less 290 or more	1335 1467	110+TT	M20	M56
64- 74	1537	945	30	190	115	●	565	280	-	76	24	265 or less 280 or more	1962 1965	145+TT	M30	M72
75- 83	1556	965	38	190	92	●	690	280	-	95	24	265 or less 280 or more	1980 1983	145+TT	M36	M85
84-110	see page 51															

■ Rod take - out = (factor) ± (Actual Travel / 2) ● "I" dimension for sizes 10 through 63 equals "B" plus "Q"  
 (+: Moving Up, - : Moving Down)

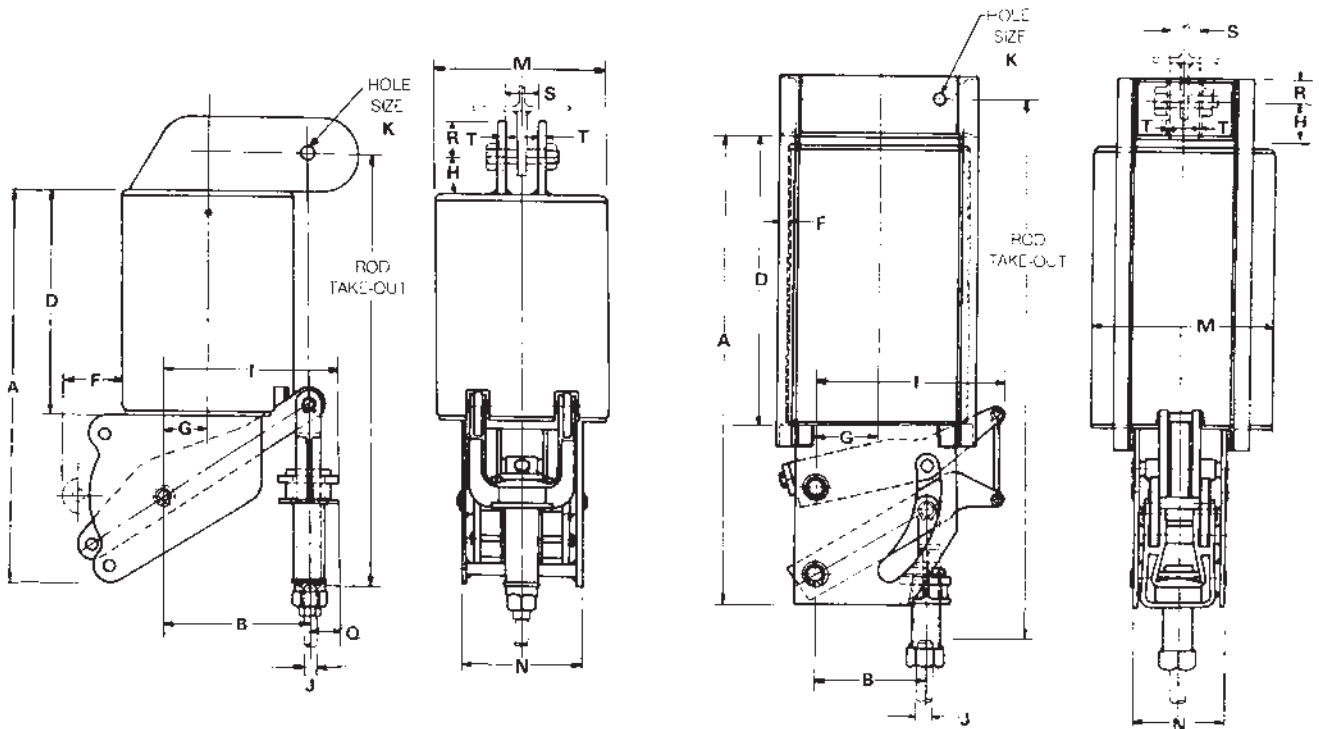
J-rod, K-hole selection chart

load kg	0 362	363 680	681 1152	1153 1814	1815 2767	2768 4263	4264 6078	6079 8300	8301 11203	11204 14061	14062 17690	17691 21772	21773 26308
J-rod size	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85
K-hole size	18	22	26	33	39	46	52	62	70	78	86	91	96

For constant support sizes 50-63 and 64-74 where M30 rod is required, check the "R" dimensions versus the Model "WBA" welded beam attachment dimensions for compatibility.

constant support vertical type - C

model : CSV - C



sizes 10-63

sizes 64-83

NOTES : See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

dimensions(mm)

hanger size	A	D	F	G	H	I	diam M	N	Q	R	T	total travel	factor <sup>■</sup>	J-rod		
														min thread length	min rod diam	max rod diam
1- 9	available in model CSH only.															
10- 18	418	225	50	38	38	●	216	160	90	38	9	90 or less 100 or more	490 550	45+TT	M12	M20
19- 34	667	405	55	67	50	●	319	213	102	38	16	125 or less 140 or more	790 843	60+TT	M12	M30
35- 49	795	465	120	75	75	●	356	252	140	33K-hole and smaller, 38 39K-hole and larger, 52	19	150 or less 165 or more	937 1055	85+TT	M12	M42
50- 63	1190	715	210	150	100	●	457	285	165	26K-hole, 38 33K-hole, 50 46K-hole and larger, 76	24	280 or less 290 or more	1335 1467	110+TT	M20	M56
64- 74	1525	933	30	190	127	645	565	280	-	76	24	265 or less 280 or more	1962 1965	145+TT	M30	M72
75- 83	1537	945	38	190	108	645	690	280	-	95	24	265 or less 280 or more	1980 1983	145+TT	M36	M85
84-110	see page 51															

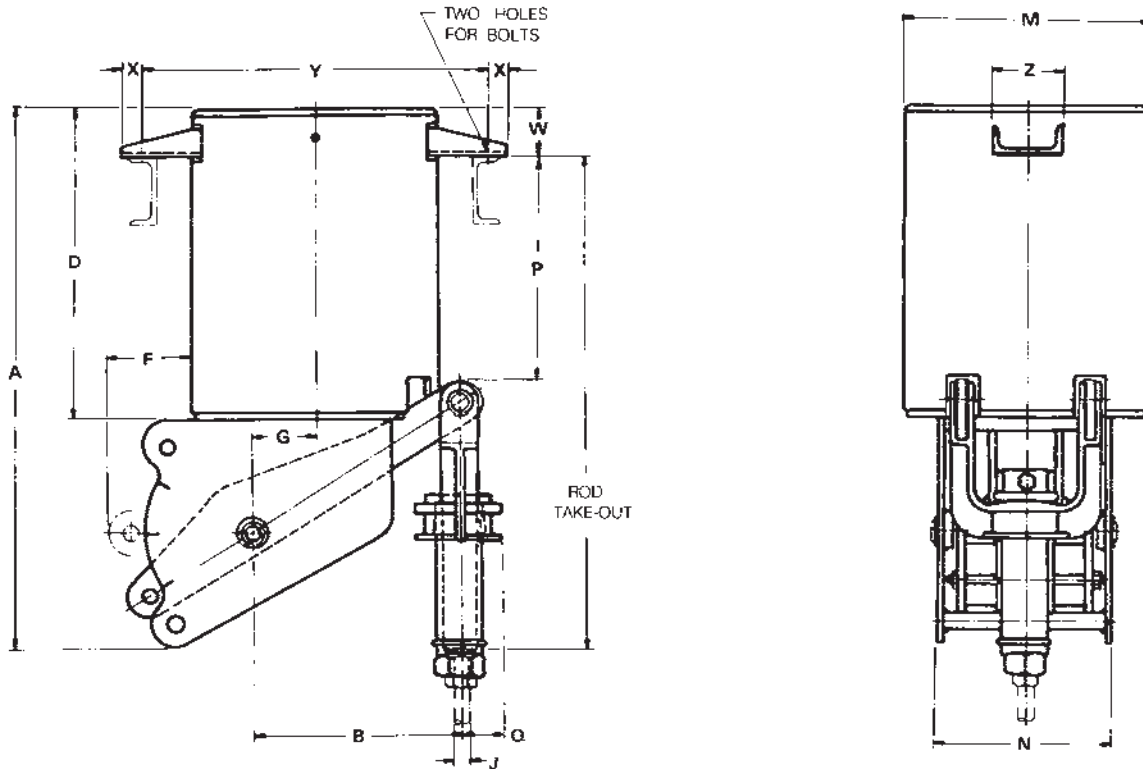
■ Rod take - out = (factor) ± (Actual Travel / 2) ● "I" dimension for sizes 10 through 63 equals "B" plus "Q"  
 (+ : Moving Up, - : Moving Down)

J-rod, K-hole selection chart

load kg	0	363	681	1153	1815	2768	4264	6079	8301	11204	14062	17691	21773
	362	680	1152	1814	2767	4263	6078	8300	11203	14061	17690	21772	26308
J-rod size	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85
K-hole size	18	22	26	33	39	46	52	62	70	78	86	91	96
S	22	27	32	40	50	60	67	73	80	86	92	98	105

constant support vertical type -D

model : CSV -D



NOTES : See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

dimensions(mm)

hanger size	A	D	F	G	diam M	N	Q	P	W	X	Y	Z	bracket hole diam	total travel	factor <sup>■</sup>	J-rod		
																min thread length	min rod diam	max rod diam
1- 9	available in model CSH only.																	
10- 18	418	225	50	38	216	160	90	125	60	38	273	75	18	90 or less 100 or more	395 452	45+TT	M12	M20
19- 34	667	405	55	67	319	213	102	318	60	38	378	75	22	125 or less 140 or more	678 732	60+TT	M12	M30
35- 49	795	465	120	95	356	252	140	337	67	50	425	100	26	150 or less 165 or more	795 910	85+TT	M12	M42
50- 63	1190	715	210	150	457	285	165	622	73	75	533	150	33	280 or less 290 or more	1157 1292	110+TT	M20	M56
64- 83	available in model CSH only																	
84-110	not available																	

$$\blacksquare \text{ Rod take-out} = (\text{factor}) \pm \left( \frac{\text{Actual Travel}}{2} \right)$$
 (+ : Moving Up, - : Moving Down)

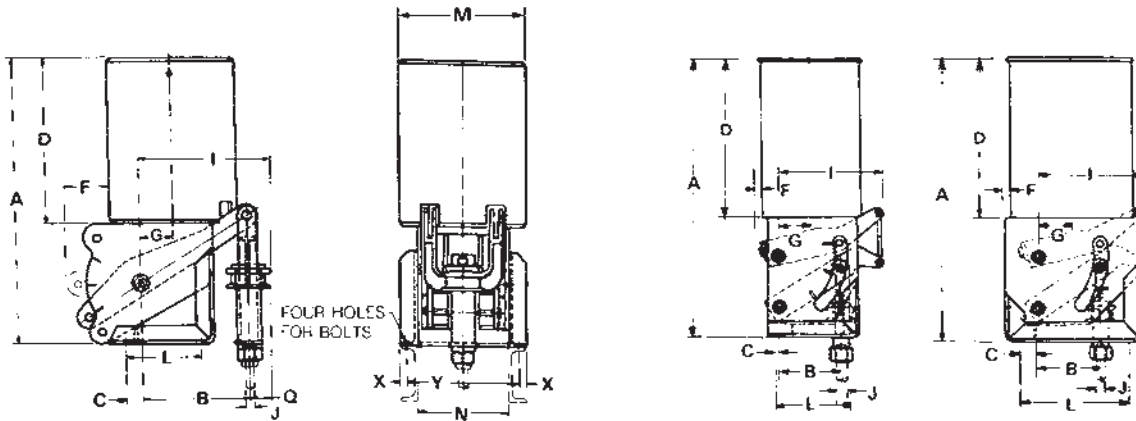
J-rod selection chart

load kg	0	363	681	1153	1815	2768	4264	6079	8301
	362	680	1152	1814	2767	4263	6078	8300	11203
rod diam	M12	M16	M20	M24	M30	M36	M42	M48	M56



constant support vertical type - E

model : CSV - E



sizes 10-63

sizes 64-74

sizes 75-83

NOTES : See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

dimensions(mm)

hanger size	A	C	D	F	G	I	L	diam M	N	Q	X	Y	bracket hole diam	total travel	factor	J-rod		
																min thread length	min rod diam	max rod diam
1- 9	available in model CSH only.																	
10- 18	418	38	225	50	38	●	110	216	160	90	16	205	18	90 or less 100 or more	37 95	45+TT	M12	M20
19- 34	667	46	405	55	67	●	170	319	213	102	16	260	18	125 or less 140 or more	70 125	60+TT	M12	M30
35- 49	795	48	465	120	95	●	210	356	252	140	20	315	22	150 or less 165 or more	65 180	85+TT	M12	M42
50- 63	1190	95	715	210	150	●	325	457	285	165	33	373	33	280 or less 290 or more	40 178	110+TT	M20	M56
64- 74	1575	10	908	10	190	645	400	565	280	-	40	380	39	256 or less 280 or more	232 235	145+TT	M30	M72
75- 83	1588	133	908	38	190	645	650	690	280	-	44	395	39	265 or less 280 or more	222 225	145+TT	M36	M85
84-110	not available																	

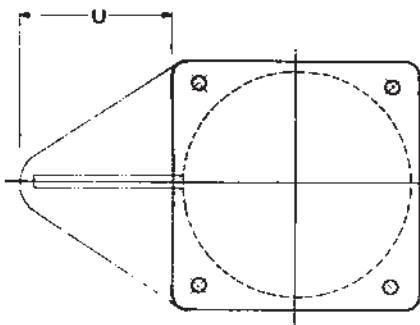
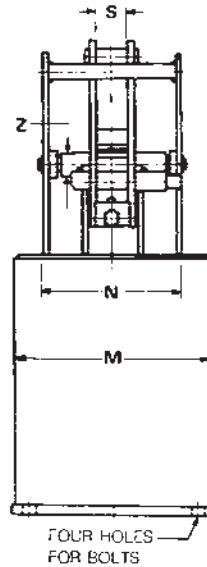
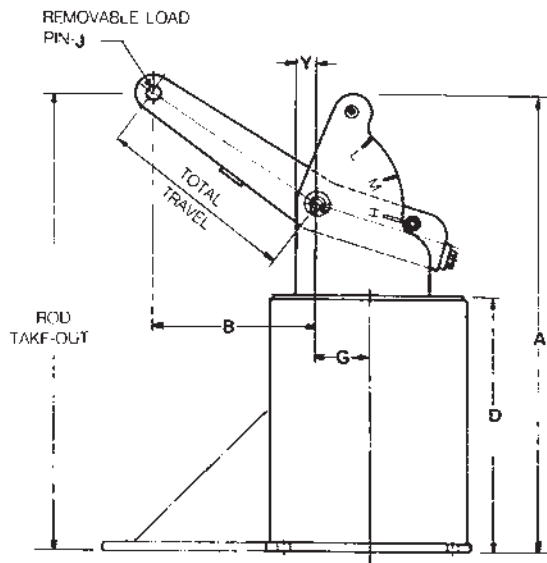
■ Rod take - out =  $(\text{factor}) \pm \left( \frac{\text{Actual Travel}}{2} \right)$  ● "I" dimension for sizes 10 through 63 equals "B" plus "Q"  
 (+ : Moving Up, - : Moving Down)

J-rod selection chart

load kg	0	363	681	1153	1815	2768	4264	6079	8301	11204	14062	17691	21773
	362	680	1152	1814	2767	4263	6078	8300	11203	14061	17690	21772	26308
rod diam	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85

constant support vertical type-F

model : CSV-F



**BOTTOM VIEW**

hanger size	total travel(mm)	U (mm)
10 to 18	125 thru 205	125
19 to 34	180 thru 255	185
35 to 49	165 thru 230 240 thru 355	180 290
50 to 63	180 thru 255 265 thru 405	215 355

**NOTES :** See load travel tables on pages 42–45 for “B” dimension. For weights see page 62.

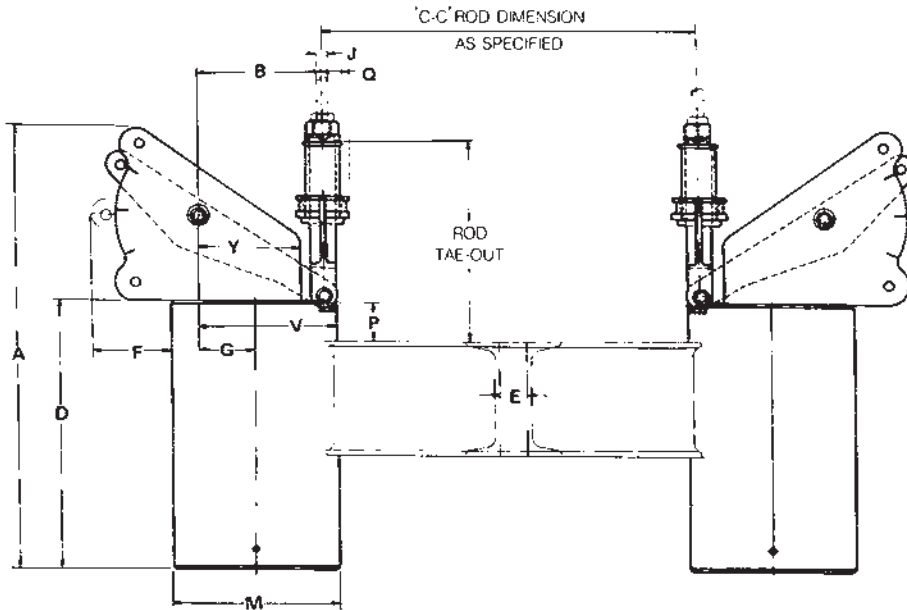
**dimensions(mm)**

hanger size	A	D	G	M	N	S	Y	Z	bottom flange square	flange bolt circle	flange hole diam	flange thick-ness	factor <sup>■</sup>	total travel	J-diam
1- 9	not available														
10- 18	422	222	38	216	160	25	25	20	230	255	10	6	320	140 or less 150 or more	M20 M12
19- 34	645	373	67	319	213	33	25	32	330	380	16	9	510	100 or less 115 or more	M30 M24
35- 49	830	470	95	356	252	57	38	40	368	432	22	16	648	180 or less 190 or more	M36 M30
50- 63	1238	727	150	457	285	57	40	50	470	533	26	19	978	200 or less 215 or more	M48 M36
64-110	not available														

$$\blacksquare \text{ Rod take-out} = (\text{factor}) \pm \left( \frac{\text{Actual Travel}}{2} \right)$$
 ( - : Moving Up, . : Moving Down )

constant support vertical type - G

model : CSV - G



**NOTES :** See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

In sizing a Type G hanger, it must be remembered that each standard spring unit carries one-half of the total pipe load. Furthermore, the weight of the hanger itself must be considered as part of the overall load. Therefore, using one-half the total pipe load, select the required hanger size from the Load-Travel table and add one-half the weight of the size hanger selected to one-half the total pipe load. If the load now exceeds the maximum load at the required total travel for the hanger size selected, it is necessary to go to the next larger hanger. If the pipe line is designed so as not to be centered on the channel, one spring of the trapeze will carry a

heavier load than the other and care must be taken in sizing the individual hanger units. The center-to-center rod dimension must be specified when ordering. The minimum C-C dimension can be determined as follows:

B plus Q greater than Y:O.D. of pipe covering plus 2Q.

B plus Q less than Y:O.D. of pipe covering plus 2(Y minus B).

**NOTES :** If U-bolt is used to fasten pipe to channels, C-C of U-bolt tangents plus one washer plate width cannot be greater than C-C of the hanger rods minus 2(V minus B).

**dimensions(mm)**

hanger sizes	A	D	E	F	G	diam M	N	P	Q	V	Y	total travel	factor <sup>a</sup>	J-rod		
														min thread length	min rod diam	max rod diam
1- 9	not available															
10- 18	418	225	25	50	38	216	see type A	65	90	148	100	90 or less 100 or more	297 355	45+TT	M12	M20
19- 34	667	405	32	55	67	319		90	102	230	155	125 or less 140 or more	427 475	60+TT	M12	M30
35- 49	795	465	38	120	95	356		85	140	273	203	150 or less 165 or more	490 605	85+TT	M12	M42
50- 63	1190	715	55	210	150	457		100	165	375	278	280 or less 290 or more	625 762	110+TT	M20	M56
64-110	not available															

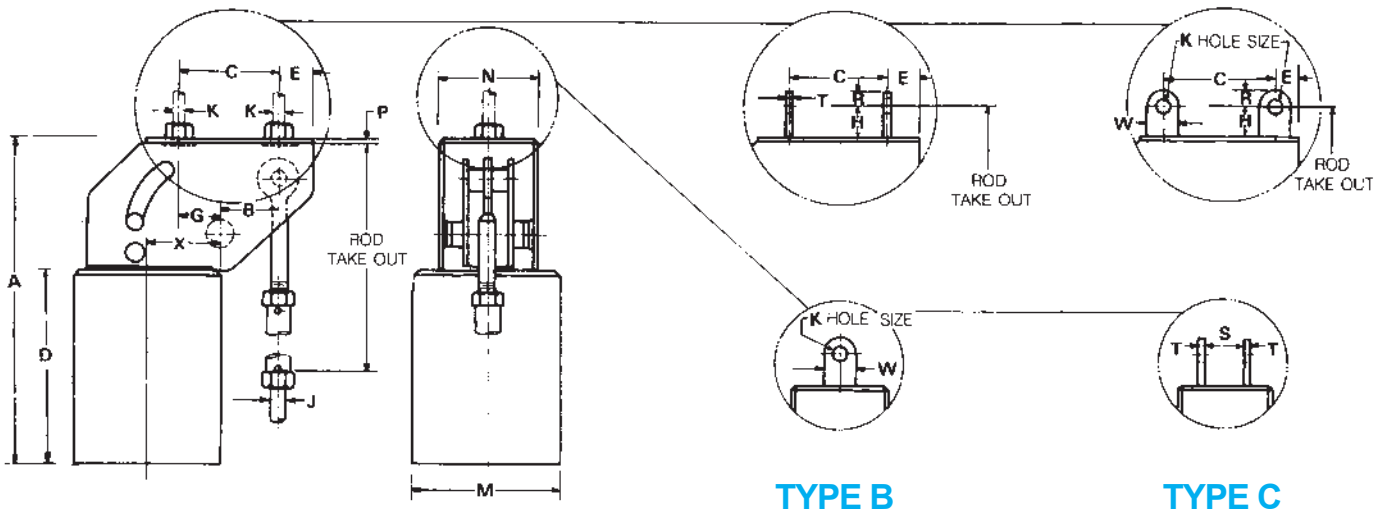
■ Rod take out = (factor) ± (  $\frac{\text{Actual Travel}}{2}$  ) ( : Moving Up, - : Moving Down)

**J-rod selection chart**

load, kg	0 362	363 680	681 1152	1153 1814	1815 2767	2768 4263	4264 6078	6079 8300	8301 11203
rod diam	M12	M16	M20	M24	M30	M36	M42	M48	M56

constant support  
vertical type - A, B and C for size 84 to 110

model : CSV - A  
CSV - B  
CSV - C



**NOTES :** "B" Dimension is a function of total travel ("G" plus "B" should not be assumed as equal to "C" dimension).

Types A, B and C sizes 84 to 110, for large loads and long travels, provide for basically the same methods of upper attachment as sizes 10 to 83 shown on pages 46-48.

**NOTES :** See load travel table on pages 42-45 for "B" dimension. For weights see page 62.

**dimensions(mm)**

hanger sizes	total travel	A	C		D	E		G		H	M	N	P	X	factor <sup>a</sup>		J-rod		
			types A&B	type C		types A&B	type C	types A&B	type C						type A	types B&C	min thread length	rod diam	
																		min	max
84- 94	240 or less 255 or more	2000	405	380	1265	102	115	38	25	150	610	267	76	305	1162 1410	1390 1638	255 330	M48	M95
95-110	355 or less 370 or more	2540	610	585	1625	102	115	190	178	150	610	292	90	343	1435 1660	1675 1902	305 380	M64	M95

■ Rod take-out = (factor) minus (0.75 x Actual Travel)

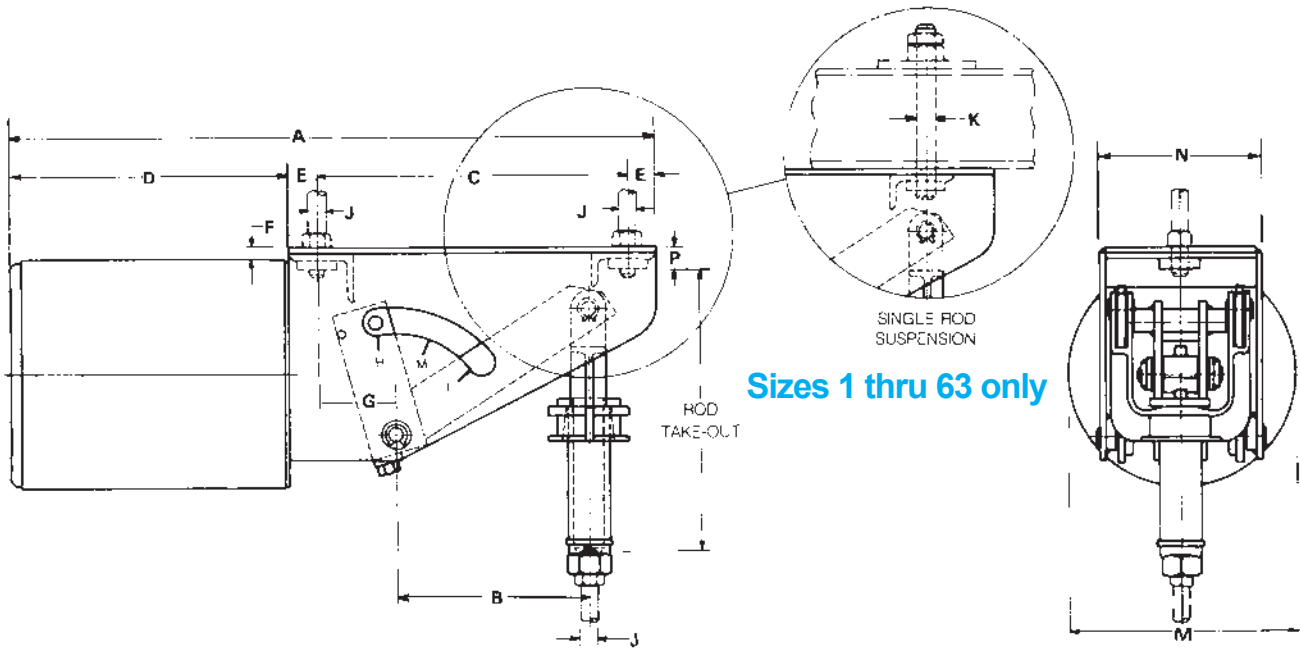
**J-rod, K-rod, K-hole selection chart**

load kg	6521 8301	8302 11204	11205 14061	14062 17690	17691 21772	21773 26308	26309 31299	31300 39689
J & K-Rods	M48	M56	M64	M72	M80	M85	M90	M95
K-Hole	62	70	76	81	91	96	101	106
R	75	75	102	102	105	118	116	118
S	73	80	85	92	98	105	111	117
T(Type B)	19	19	24	24	24	24	38	45
T(Type C)	19	19	24	24	24	24	32	32
W	150	150	204	204	210	236	236	236



constant support horizontal type-A

model : CSH-A



Sizes 1 thru 63 only

**NOTES:** Also available for single rod suspension as indicated above. When ordering specify "for single rod suspension."

See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

dimensions(mm)

hanger sizes	total travel	A	C	D	E	F	G	M	N	P	factor <sup>■</sup>	J-rod		
												min thread length	min rod diam	max rod diam
1- 9	100 or less 115 or more	352 455	152 255	150	25	22	50	155	105	20	325 390	45+TT	M12	M12
10- 18	90 or less 100 to 125 140 or more	468 468 545	203 203 280	215	25	13	65	210	160	17	275 337 337	45+TT	M12	M20
19- 34	125 or less 140 or more	686 791	255 360	367	32	15	98	315	213	30	415 470	60+TT	M12	M30
35- 49	150 or less 165 or more	803 1006	280 483	433	45	17	120	350	252	35	485 602	85+TT	M12	M42
50- 63	205 or less 215 to 280 290 or more	1156 1361 1361	405 610 610	665	43	25	195	450	285	45	633 633 768	110+TT	M20	M56
64- 74	265 or less 280 or more	1458 1598	400 540	908	75	83	133	565	280	87	875 878	145+TT	M30	M72
75- 83	265 or less 280 or more	1461 1601	367 527	908	83	92	127	690	280	108	927 930	145+TT	M36	M85
84-110	see page 57													

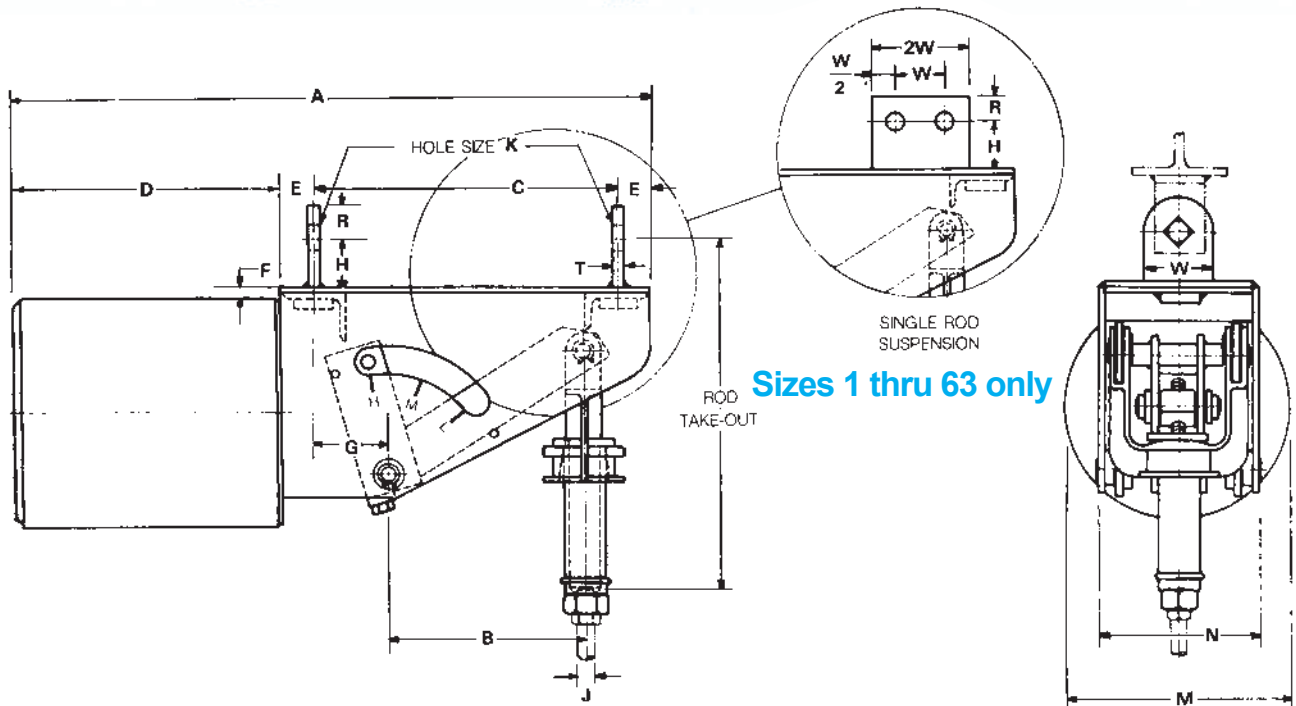
■ Rod take - out = (factor) ×  $\left(\frac{\text{Actual Travel}}{2}\right)$  ( : : Moving Up, - : Moving Down)

J-rod, K-rod selection chart

load kg	0	363	681	1153	1815	2768	4264	6079	8301	11204	14062	17691	21773
	362	680	1152	1814	2767	4263	6078	8300	11203	14061	17690	21772	26308
J-rod diam.	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85
K-rod diam.	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85	M90

constant support horizontal type - B

model : CSH-B



**NOTES :** Also available for single rod suspension as indicated above. When ordering specify "for single rod suspension."

See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

**dimensions(mm)**

hanger sizes	total travel	A	C	D	E	F	G	H	M	N	factor <sup>■</sup>	J-rod		
												min thread length	min rod diam	max rod diam
1- 9	100 or less 115 or more	354 454	140 240	150	32	22	45	40	155	105	370 437	45+TT	M12	M12
10- 18	90 or less 100 to 125 140 or more	469 469 546	190 190 267	215	32	13	60	40	210	160	332 392 392	45+TT	M12	M20
19- 34	125 or less 140 or more	685 789	248 352	367	35	15	95	50	315	213	495 550	60+TT	M12	M30
35-49	150 or less 165 or more	800 1003	267 470	433	50	17	115	75	350	252	595 713	85+TT	M12	M42
50- 63	205 or less 215 to 280 290 or more	1155 1358 1358	340 543 543	665	75	25	162	100	450	285	780 780 915	110+TT	M20	M56
64- 74	265 or less 280 or more	1461 1801	387 527	908	83	83	127	115	565	280	1075 1080	145+TT	M30	M72
75- 83	265 or less 280 or more	1463 1803	375 515	908	90	92	120	125	690	280	1162 1165	145+TT	M36	M85
84-110	see page 57													

■ Rod take-out = (factor) ± (Actual Travel / 2) (+ : Moving Up, - : Moving Down)

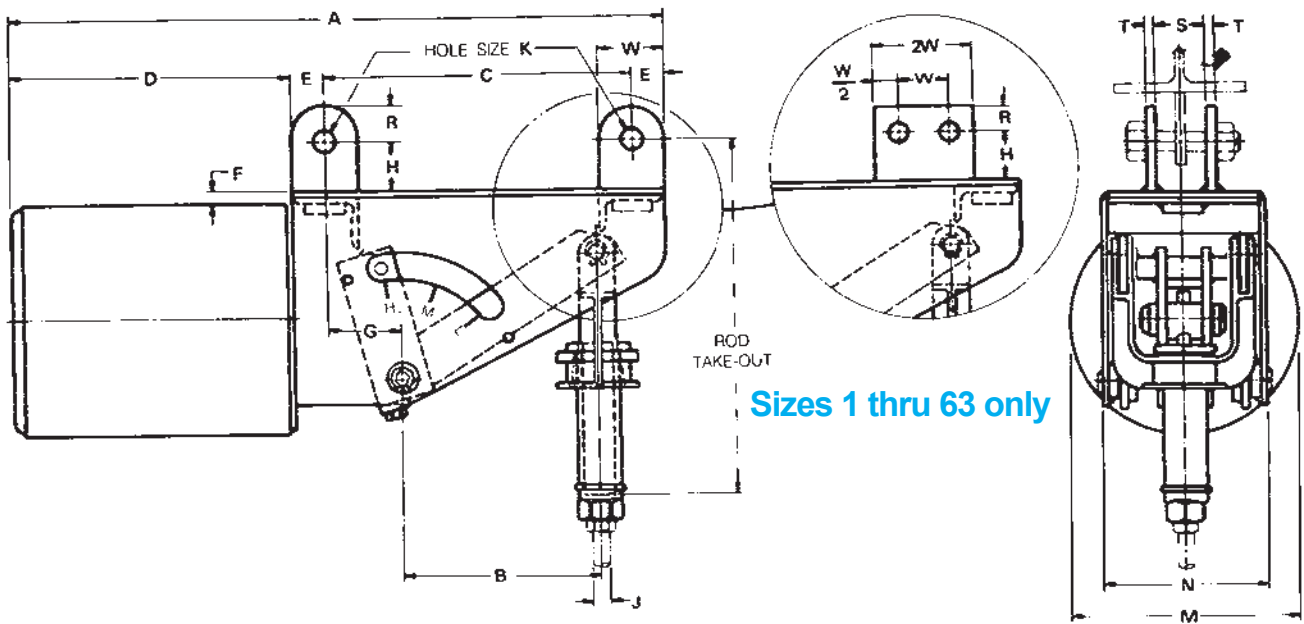
**J-rod, K-hole selection chart**

load, kg	0 362	363 680	681 1152	1153 1814	1815 2767	2768 4263	4264 6078	6079 8300	8301 11203	11204 14061	14062 17690	17691 21772	21773 26308
J-rod	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85
K-hole size	18	22	26	33	39	46	52	62	70	78	86	91	96
R	32	32	32	40	52	65	65	75	75	102	102	102	115
T	*6	*6	9	12	16	19	19	19	19	24	24	24	24
W	64	64	64	80	104	130	130	150	150	204	204	204	230

◆ 9mm thickness for single rod suspension.

constant support horizontal type-C

model : CSH-C



**NOTES :** Also available for single rod suspension as indicated above. When ordering specify "for single rod suspension."

See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

dimensions(mm)

hanger size	total travel	A	C	D	E	F	G	H	M	N	factor <sup>■</sup>	J-rod		
												min thread length	min rod diam	max rod diam
1- 9	100 or less 115 or more	354 454	140 240	150	32	22	45	40	155	105	370 437	45+TT	M12	M12
10- 18	90 or less 100 to 125 140 or more	469 469 546	190 190 267	215	32	13	60	40	210	160	332 392 392	45+TT	M12	M20
19- 34	125 or less 140 or more	686 791	215 320	367	52	15	80	50	315	213	495 550	60+TT	M12	M30
35- 49	150 or less 165 or more	803 1008	240 445	433	65	17	102	75	350	252	695 713	85+TT	M12	M42
50- 63	205 or less 215 to 280 290 or more	1155 1358 1358	340 543 543	665	75	25	162	100	450	285	780 780 915	110+TT	M20	M56
64- 74	265 or less 280 or more	1462 1602	350 490	908	102	83	108	115	565	280	1075 1080	145+TT	M30	M72
75- 83	265 or less 280 or more	1463 1603	325 465	908	115	92	95	125	690	280	1162 1165	145+TT	M36	M85
84-110	see page 57													

■ Rod take-out = (factor) ± (Actual Travel / 2)

(+ : Moving Up, - : Moving Down)

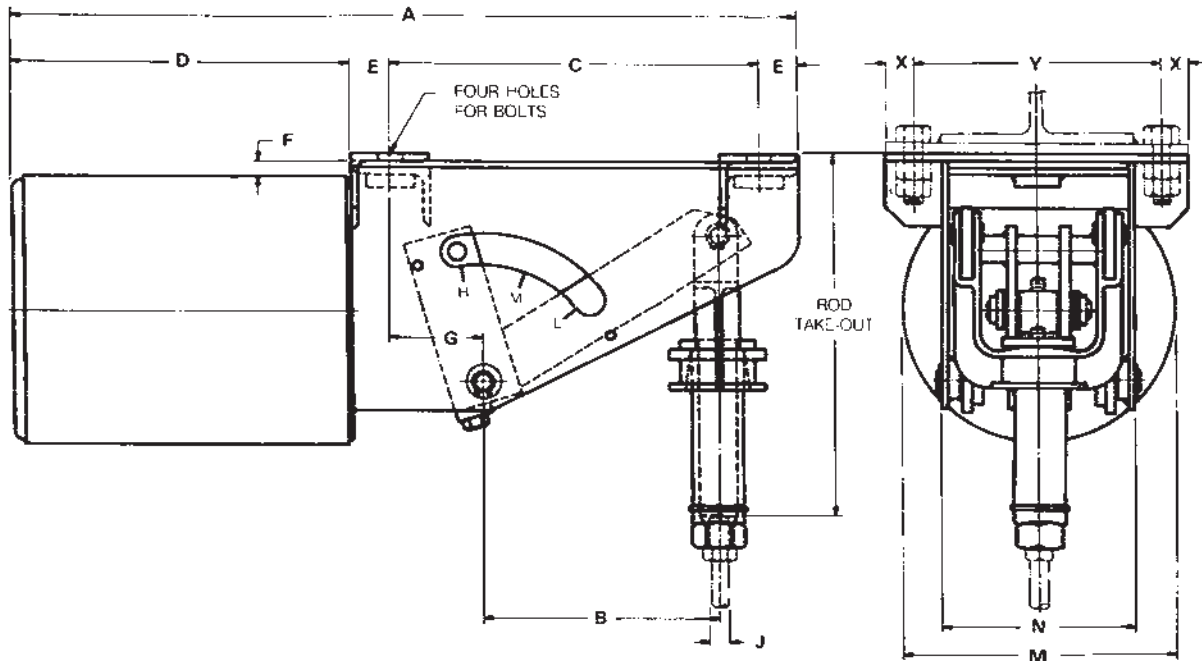
J-rod, K-hole selection chart

load, kg	0 362	363 680	681 1152	1153 1814	1815 2767	2768 4263	4264 6078	6079 8300	8301 11203	11204 14061	14062 17690	17691 21772	21773 26308
J-rod	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85
K-hole size	18	22	26	33	39	46	52	62	70	78	86	91	96
R	32	32	32	40	52	65	65	75	75	102	102	102	115
S	22	27	32	40	50	60	67	73	80	86	92	98	105
T	*6	*6	9	12	16	19	19	19	19	24	24	24	24
W	64	64	64	80	104	130	130	150	150	204	204	204	230

◆ 9mm thickness for single rod suspension.

constant support horizontal type-D

model : CSH-D



NOTES : See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

dimensions(mm)

hanger size	total travel	A	C	D	E	F	G	M	N	X	Y	bracket hole diam	factor <sup>■</sup>	J-rod		
														min thread length	min rod diam	max rod diam
1- 9	100 or less 115 or more	352 455	152 255	150	25	22	50	155	105	20	143	14	340 405	45+TT	M12	M12
10- 18	90 or less 100 to 125 140 or more	468 468 545	203 203 280	215	25	13	65	210	160	22	203	18	300 360 360	45+TT	M12	M20
19- 34	125 or less 140 or more	683 788	240 345	367	38	15	92	315	213	30	273	18	450 505	60+TT	M12	M30
35- 49	150 or less 165 or more	800 1003	267 470	433	50	17	115	350	252	35	320	22	530 645	85+TT	M12	M42
50- 63	205 or less 215 to 280 290 or more	1155 1360 1360	390 595 595	665	50	25	187	450	285	40	370	33	687 687 822	110+TT	M20	M56
64- 74	265 or less 280 or more	1458 1598	400 540	908	75	83	133	565	280	50	380	39	975 978	145+TT	M30	M72
75- 83	265 or less 280 or more	1458 1598	400 540	908	75	92	120	690	280	50	380	39	1048 1050	145+TT	M36	M85
84-110	not available															

■ Rod take - out = (factor) ± (  $\frac{\text{Actual Travel}}{2}$  ) ( + : Moving Up, - : Moving Down )

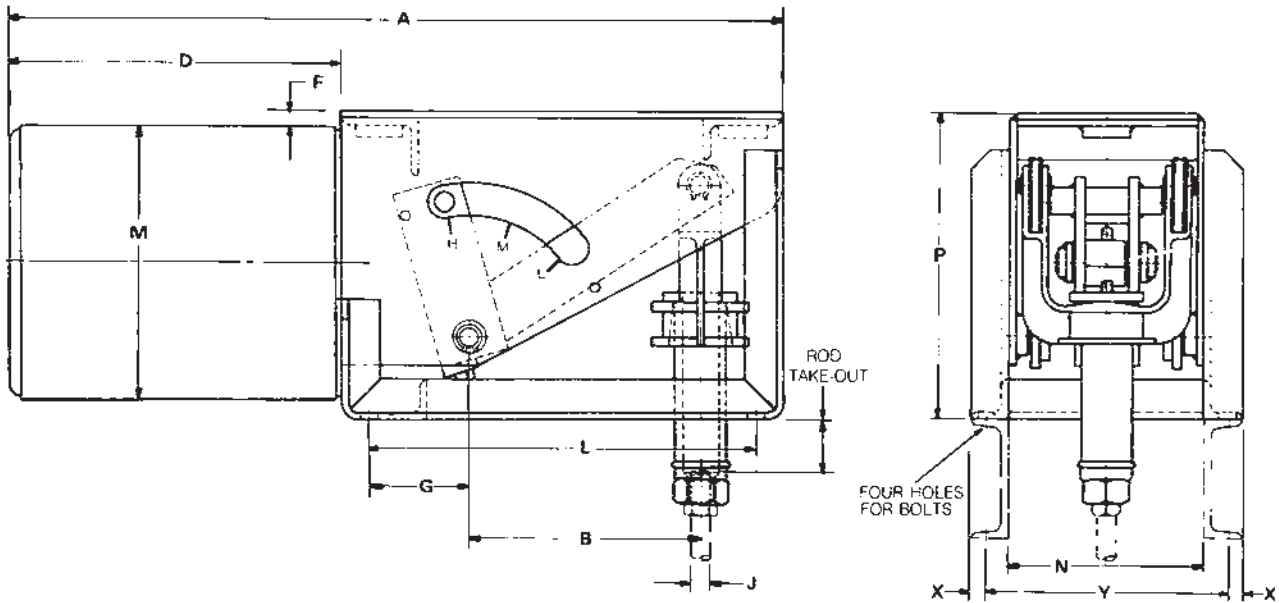
J-rod selection chart

load kg	0	363	681	1153	1815	2768	4264	6079	8301	11204	14062	17691	21773
rod diam.	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85



constant support horizontal type-E

model : CSH-E



NOTES : See load travel tables on pages 42-45 for "B" dimension. For weights see page 62.

dimensions(mm)

hanger size	total travel	A	D	F	G	L	M	N	P	X	Y	bracket hole diam	factor <sup>■</sup>	J-rod		
														min thread length	min rod diam	max rod diam
1- 9	100 or less 115 or more	354 455	150	24	50	152 255	155	105	205	17	151	14	130 195	45+TT	M12	M12
10- 18	90 or less 100 to 125 140 or more	468 468 545	215	14	60	190 190 267	210	160	250	17	206	18	45 103 103	45+TT	M12	M20
19- 34	125 or less 140 or more	684 789	367	17	98	255 360	315	213	360	17	259	18	85 140	60+TT	M12	M30
35- 49	150 or less 165 or more	800 1003	433	19	130	295 498	350	252	395	20	312	22	125 240	85+TT	M12	M42
50- 63	205 or less 215 to 280 290 or more	1155 1360 1360	665	25	187	390 595 595	450	285	502	32	371	33	175 175 310	110+TT	M20	M56
64- 74	265 or less 280 or more	1481 1600	908	84	155	445 585	565	280	683	40	380	39	283 285	145+TT	M30	M72
75- 83	265 or less 280 or more	1461 1600	908	94	155	445 585	690	280	810	40	380	39	230 232	145+TT	M36	M85
84-110	see page 57															

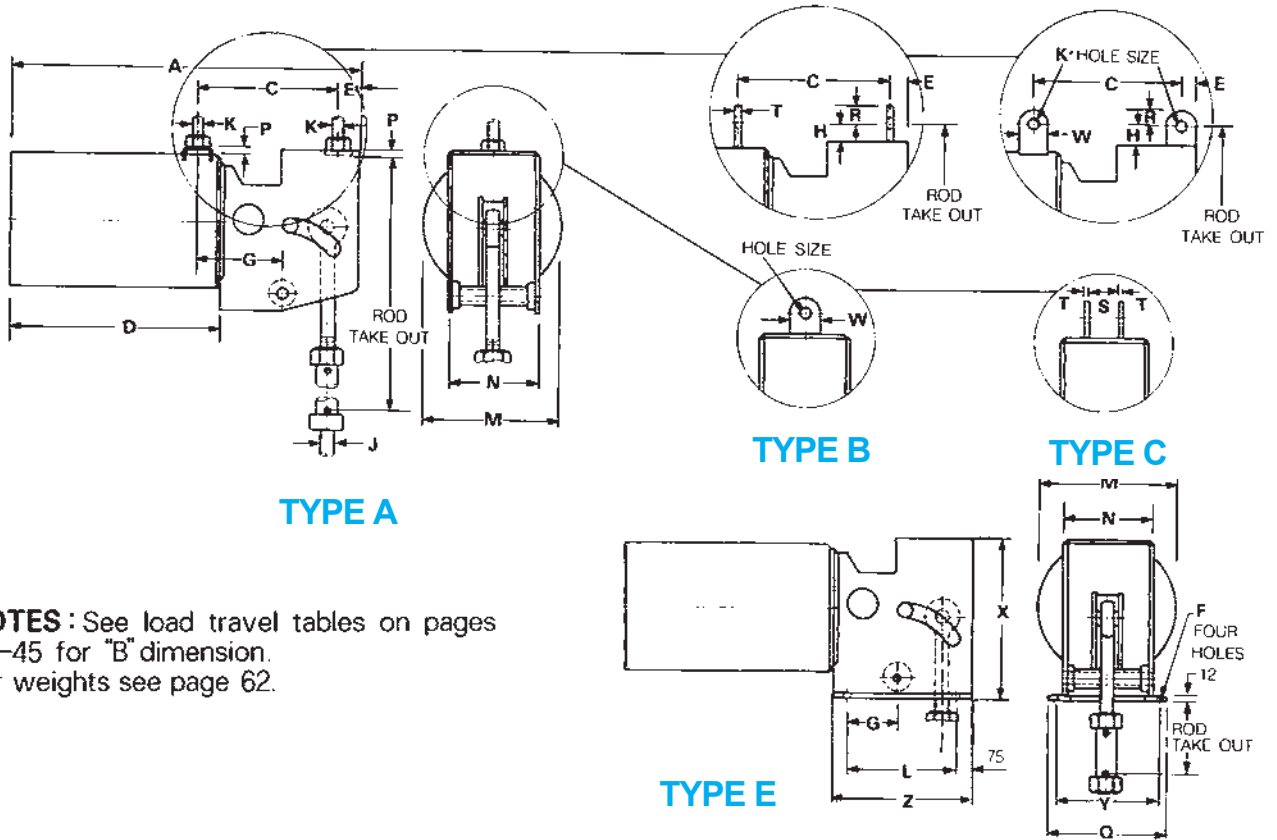
■ Rod take-out = (factor) ± (Actual Travel / 2) (±: Moving Up, -: Moving Down)

J-rod selection chart

load kg	0	363	681	1153	1815	2768	4264	6079	8301	11204	14062	17691	21773
	362	680	1152	1814	2767	4263	6078	8300	11203	14061	17690	21772	26308
rod diam.	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M85

constant support horizontal type - A, B, C and E model : CSH - A  
for sizes 84 to 110

CSH - B  
CSH - C  
CSH - E



NOTES : See load travel tables on pages 42-45 for "B" dimension.  
For weights see page 62.

dimensions(mm)

hanger size	total travel	A	C		D	E		G		H	L	M	N	P	Q	X	Y	Z	factor*			J-rod		
			types A&B	type C		types A B&C	type C	F	types A, B&C										type E	type A	types B&C	type E	min thread length	rod diam
84- 94	240 or less 255 or more	1950	710	700	1265	102	115	26	355	152	150	533	267	75	405	885	330	686	1337 1585	1565 1813	550 797	255 330	M48	M95
95-110	355 or less 370 or more	2540	1245	1232	1625	102	115	33	730	222	150	762	292	90	432	940	368	915	1300 1527	1540 1768	448 675	305 380	M64	M95

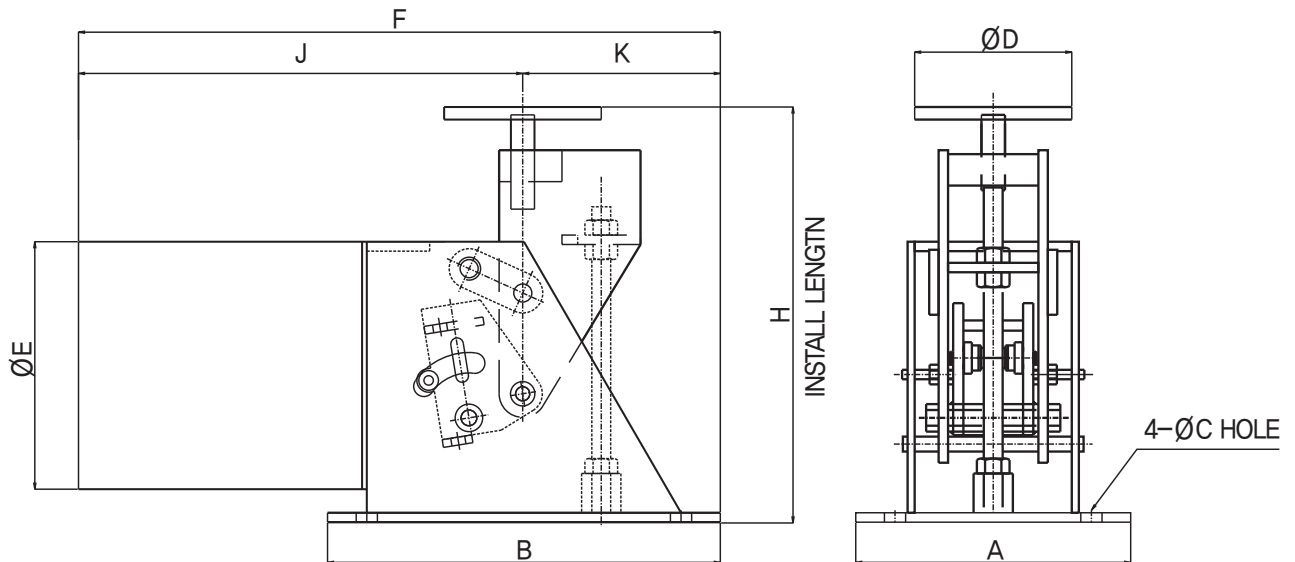
■ Rod take-out = (factor) minus (0.75 × total travel)

J-rod, K-rod, K-hole selection chart

load kg	6521	8301	11204	14062	17691	21773	26309	31299
	8300	11203	14061	17690	21772	26308	31298	39690
J & K-rods	M48	M56	M64	M72	M80	M85	M90	M95
K-Hole	62	70	78	86	91	96	101	106
R	78	78	105	105	105	118	118	118
S	73	80	85	92	98	105	110	117
T(Type B)	19	19	24	24	24	24	38	45
T(Type C)	19	19	24	24	24	24	32	32
W	156	156	210	210	210	236	236	236

## constant support horizontal type-F

model : CSH-F



## install length. Dimensions (mm)

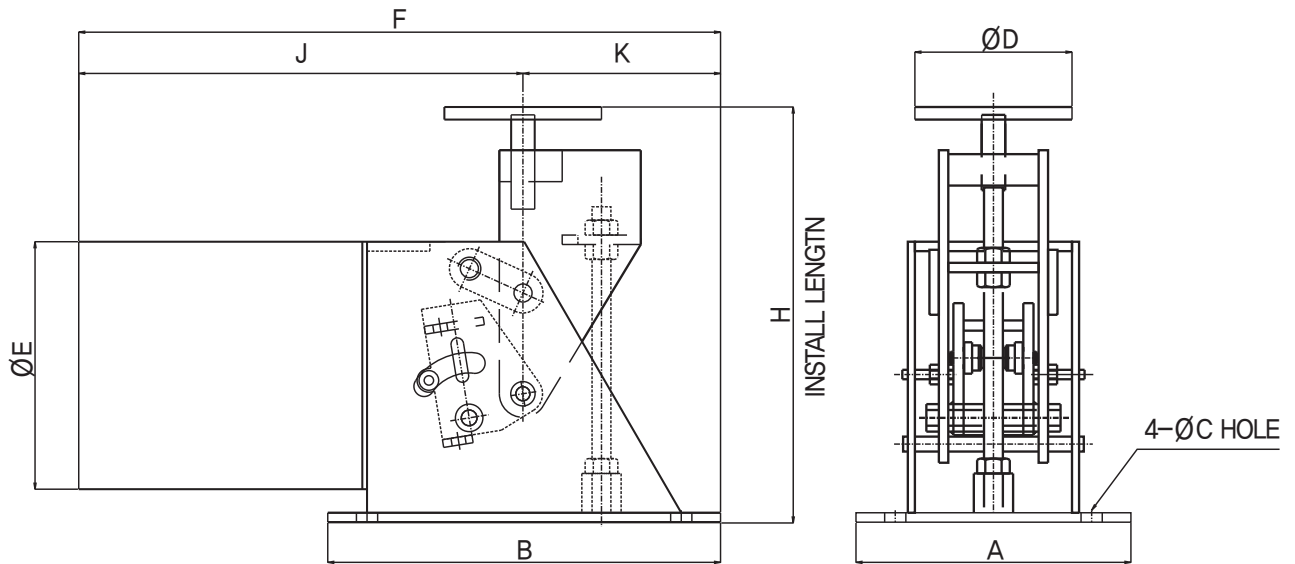
No.	hanger size	Total Travel	Bottom Plate (TxAxB)				Load Flange D	Casing $\Phi$ ExF	factor
			T	A	B	Hole C			
1	1~9	140 or less	6	200	300	15	9Tx $\Phi$ 125	$\Phi$ 156 x 461	317
2	1~9	200 or less	6	200	350	15	9Tx $\Phi$ 125	$\Phi$ 156 x 511	367
3	10~18	140 or less	9	250	450	23	9Tx $\Phi$ 125	$\Phi$ 210 x 615	460
4	10~18	205 or less	9	250	450	23	9Tx $\Phi$ 125	$\Phi$ 210 x 615	500
5	10~18	230 or less	9	250	450	23	9Tx $\Phi$ 125	$\Phi$ 210 x 615	550
6	19~34	150 or less	12	350	500	23	12Tx $\Phi$ 200	$\Phi$ 315 x 817	505
7	19~34	240 or less	12	350	550	23	12Tx $\Phi$ 200	$\Phi$ 315 x 867	560
8	19~34	290 or less	12	350	600	23	12Tx $\Phi$ 200	$\Phi$ 315 x 917	610
9	35~49	165 or less	16	400	600	23	16Tx $\Phi$ 200	$\Phi$ 350 x 958	668
10	50~63	165 or less	16	400	700	23	19Tx $\Phi$ 260	$\Phi$ 450 x 1315	734
11	50~63	205 or less	16	400	700	23	19Tx $\Phi$ 260	$\Phi$ 450 x 1315	764
12	64~74		19	550	850	23	25Tx $\Phi$ 300	$\Phi$ 565x 1664	950

$$\text{Install length(H)} = (\text{factor}) \pm \frac{\text{Actual Travel}}{2}$$

( + : Moving down, - : Moving up )

constant support horizontal type-F

model : CSH-F



"J" Dimensions (mm)

Size	TOTAL TRAVEL													
	75	90	100	115	125	140	150	165	180	190	205	215	230	240
1~9	295	309	318	332	341	355	364	378	392	401	415	424	438	447
10~18	374	388	397	411	420	434	443	457	471	480	494	503	517	526
19~34	566	580	589	603	612	626	635	649	663	672	686	695	709	718
35~49	667	381	690	704	713	727	736	750	764	773	787	796	810	819
50~63	972	986	995	1009	1018	1032	1041	1055	1069	1078	1092	1101	1115	1124
64~83	1187	1201	1210	1224	1233	1247	1256	1270	1284	1293	1307	1316	1330	1339

NOTE : K = F - J

## constant support

## weight (approx) kg

hanger size	CSV						CSH				Hanger size	CSV						CSH			
	type A	B	C	D	E	F	type G	type A	B	C		D	E	type F	type A	B	C	D	E	type F	
1	-	-	-	-	-	-	-	8					12	56	302					261	392
2	-	-	-	-	-	-	-	8					12	57	302					279	419
3	-	-	-	-	-	-	-	8					12	58	320					279	419
4	-	-	-	-	-	-	-	10					15	59	320					279	419
5	-	-	-	-	-	-	-	10					15	60	320					279	419
6	-	-	-	-	-	-	-	10					15	61	338					297	446
7	-	-	-	-	-	-	-	10					15	62	338					297	446
8	-	-	-	-	-	-	-	10					15	63	338					297	446
9	-	-	-	-	-	-	-	10					15	64	666					556	834
10	28						73	24					36	65	666					556	834
11	28						73	24					36	66	711					601	902
12	28						73	24					36	67	711					601	902
13	29						75	25					38	68	711					601	902
14	29						75	25					38	69	750					640	960
15	29						75	25					38	70	750					640	960
16	32						80	27					41	71	750					640	960
17	32						80	27					41	72	795					689	1034
18	32						80	27					41	73	795					689	1034
19	74						168	68					102	74	795					689	1034
20	74						168	68					102	75	1070					894	-
21	75						170	69					104	76	1070					894	-
22	75						170	69					104	77	1070					894	-
23	75						170	69					104	78	1102					916	-
24	78						176	72					108	79	1102					916	-
25	78						176	72					108	80	1102					916	-
26	82						176	72					108	81	1166					989	-
27	82						184	76					114	82	1166					989	-
28	82						184	76					114	83	1166					989	-
29	82						184	76					114	84	1236					1048	-
30	85						190	79					119	85	1236					1048	-
31	85						190	79					119	86	1302					1114	-
32	85						190	79					119	87	1302					1114	-
33	88						197	83					125	88	1302					1114	-
34	88						197	83					125	89	1393					1204	-
35	136						307	127					191	90	1393					1204	-
36	136						307	127					191	91	1431					1243	-
37	136						307	127					191	92	1431					1243	-
38	143						320	134					201	93	1476					1288	-
39	143						320	134					201	94	1476					1288	-
40	143						320	134					201	95	1973					1780	-
41	151						336	142					213	96	1973					1780	-
42	151						336	142					213	97	1973					1780	-
43	151						336	142					213	98	1973					1780	-
44	156						346	147					221	99	2121					1928	-
45	156						346	147					221	100	2121					1928	-
46	156						346	147					221	101	2121					1928	-
47	163						361	154					231	102	2121					1928	-
48	163						361	154					231	103	2404					2211	-
49	163						361	154					231	104	2404					2211	-
50	273						590	232					348	105	2404					2211	-
51	273						590	232					348	106	2404					2211	-
52	284						602	243					365	107	2631					2427	-
53	284						602	243					365	108	2631					2427	-
54	284						602	243					365	109	2631					2427	-
55	302						638	261					392	55	2631					2427	-

■ Based on 915mm 'C-C' dimension and 205mm total travel.